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MEASURING CUSTOMER SATISFACTION OF DEPOT MAINTENANCE: AN ANALYSIS OF CUSTOMER SATISFACTION OF F/A-18 MAINTENANCE AT NAVAL AVIATION DEPOT NORTH ISLAND, CA

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The Department of Defense (DoD) spends about $15 billion annually on depot level maintenance. About 60 percent of this funding is provided to government owned and operated depots. In light of defense budget downsizing, it has become more critical than ever that depots are run in the most efficient manner possible. DoD has tried to adopt a "best commercial practices" approach to improve efficiency of depot maintenance. A key focus of commercial practices is delivering customer satisfaction. To this extent, it is imperative that DoD depots understand and properly measure their customer's concerns if they wish to improve their performance. An adaptation of the gaps model, developed by Parasuraman, Zeithamal and Berry in 1985, was used to measure the current customer satisfaction of the NADEP NI F/A-18 aircraft maintenance program. The gaps model measures differences between customer expectations and perceptions of performance of various attributes, and ranks the attributes by importance. A pretest questionnaire was developed and sent out to customers of NADEP NI's F/A-18 aircraft maintenance program in order to evaluate alternative measures of customer satisfaction. Through this process, a tailored set of customer satisfaction measures was developed to provide better feedback to the depot management team and improve the depot maintenance process.

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The Department of Defense (DoD) spends about $15 billion annually on depot level maintenance. About 60 percent of this funding is provided to government owned and operated depots. In light of defense budget downsizing, it has become more critical than ever that depots are run in the most efficient manner possible. DoD has tried to adopt a "best commercial practices" approach to improve efficiency of depot maintenance. A key focus of commercial practices is delivering customer satisfaction. To this extent, it is imperative that DoD depots understand and properly measure their customer's concerns if they wish to improve their performance. An adaptation of the gaps model, developed by Parasuraman, Zeithamal and Berry in 1985, was used to measure the current customer satisfaction of the NADEP NI F/A-18 aircraft maintenance program. The gaps model measures differences between customer expectations and perceptions of performance of various attributes, and ranks the attributes by importance. A pretest questionnaire was developed and sent out to customers of NADEP NI's F/A-18 aircraft maintenance program in order to evaluate alternative measures of customer satisfaction. Through this process, a tailored set of customer satisfaction measures was developed to provide better feedback to the depot management team and improve the depot maintenance process.

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I. INTRODUCTION

A. WHAT IS CUSTOMER SATISFACTION? A BRIEF HISTORY

Customer satisfaction is the customer's perception that the service provider's performance meets or exceeds the customer's expectations. Measuring customer satisfaction requires assessing both customer expectations and the actual and perceived quality of service. The concept of customer satisfaction measurement is not new. It has, however, been increasing in importance as a cornerstone of a successful business philosophy. This trend began after World War II, when W. Edwards Deming went to Japan to teach quality. J.M. Juran, who also went to Japan after the war to help Japanese industry rebuild, is credited with linking quality to customer satisfaction and fitness for use.

Ironically, the Western world did not embrace Deming and Juran's concepts until Japan became a global economic threat in the late 1970's and early 1980's. By that time, Japan was producing products and services of equal or higher quality than Western manufacturers, and at a lower cost. Other factors were also contributing to a general rise in international competition. These were:

* improved transportation and communication networks
* a reduction in trade barriers
* universal access to both basic and advanced industrial know-how and technology
* a colossal increase in manufacturing output by countries outside North America
* new types of international technology agreements
* the ability of small firms to compete with larger multinationals by focusing on niche markets. (Noori 1990)

This influx of high quality, low cost goods into Western markets started the growth of consumerism. Customers began to demand quality, reliable goods and services from Western manufacturers. Western manufacturers responded for fear of losing business to the aggressive growth of Japanese manufacturers. Still, Western producers and service providers were fairly slow in shifting towards a customer oriented approach to quality. A major milestone was reached in 1979, when Philip B. Crosby published Quality is Free. Crosby showed how the cost of poor quality should include all of the resultant costs involved in not doing the job right the first time, as defined by the customer. Mainstream corporate America didn't wholeheartedly embrace the concept until the early 1990's. "Now with most everyone on the bandwagon, many executives and management gurus are labeling the 1990s the 'Decade of the Customer.'" (Phillips 1990)

B. WHY IS CUSTOMER SATISFACTION IMPORTANT?

No one would argue that an organization should produce a quality product or service. However, the definition of quality can vary depending on the perspective of the individual defining it. Quality is ultimately defined by customers as the degree to which they are satisfied with an organization's product or service.

The answer to why customer satisfaction is important to the corporate world is easy: profit. A case study of the Marriott hotel chain found that "each percentage point increase in the customer satisfaction measure-of-intent-to-return was worth some $50 million in revenues." (Connellan 1993) Similarly, a case study of IBM's AS/400 computer manufacturing site learned that "a one percent increase in customer satisfaction was worth

$257 million in additional revenues over the ensuing five years." (Connellan 1993) Especially since the rise of global competition and consumerism, beginning in the early 1980's, a business must satisfy customers to be successful in the long run. According to Peterson and Wilson, "customer satisfaction is a defensible and appropriate company objective - the glue that holds various corporate functions together and directs corporate resource allocation." They go on to state that "virtually all company activities, programs, and policies should be evaluated in terms of their contribution to satisfying customers." (Peterson & Wilson 1992) Correctly measuring customer satisfaction leads to more efficient operations which can reduce costs by identifying non-value adding tasks, but can also increase an organization's customer base.

The same principles apply in the public sector. Although profit, per se, is not the motive for most government agencies, there are many benefits that can be derived from accurately measuring the satisfaction of an agency's customers. Some of the more obvious include:

1) Optimizing resource allocation and use to balance customer expectations with departmental mandates and available resources (people, money and time).

2) Identifying opportunities for new services and for service adjustment, which could mean continuing, discontinuing, realigning or transferring services.

3) Improving the quality and effectiveness of government services.

4) Determining service relevance and importance.

5) Setting service standards.

6) Providing a method to evaluate employees for incentive purposes. (Treasury Board of Canada Secretariat 1996)

The Department of Defense (DoD) has already recognized the importance of customer satisfaction. The DoD TQM implementation guide states:

> The customer defines the purpose of the organization and every process within it. Success means striving to become the best supplier of your particular products and services in the minds of those customers. To achieve that success, your organization must align its overriding strategic vision with a vision of customer service and satisfaction. (DoD 1990)

Vice President Gore's National Performance Review also focused on improving the efficiency of the federal government by focusing on its customer - the American people.

In 1993, the President signed Executive Order 12862 - Setting Customer Service Standards. This made measuring customer satisfaction the law for all executive departments and federal government agencies that provide significant services directly to the public. Requirements include:

1) identifing the customers who are, or should be, served by the agency;
2) surveying customers to determine the kind and quality of services they want and their level of satisfaction with existing services;
3) posting service standards and measuring against them;
4) benchmarking customer service performance against the best in business;
5) providing customers with choices in both the sources of service and the means of delivery;
6) making information, service, and complaint systems easily accessible;
7) providing means to address customer complaints. (Clinton 1993)

This executive order drastically changed the focus of many government agencies.

Another major change, which affects all government agencies, not just those providing significant services directly to the public, was the Government Performance and Results Act, passed by Congress in 1993. Federal agencies are now required to "plan

strategically, develop goals that are outcome-focused, consult with their customers when developing strategic plans and develop performance plans that look to intended results, not just inputs and outputs." (Federal Quality Institute 1993)

C. PURPOSE - THESIS STATEMENT

Due to the requirements mentioned above, and at the request of the Naval Aviation Depot (NADEP), North Island (NI), CA, we conducted research to evaluate the current and alternative methods of measuring customer satisfaction of F/A-18 aircraft maintenance performed at NADEP NI. The goal of our research was to propose a tailored set of customer service measures that would provide better feedback to the depot management team and help improve the depot maintenance process. This analysis examines the customer service concerns of the depot's different external customers, including squadrons, wings, type commanders and the Naval Air Systems Command. Although designed specifically to benefit NADEP NI, it is our hope that this research will benefit other DoD depot maintenance activities and government service agencies in general.

DoD spends about $15 billion annually on depot level maintenance. About 60 percent of this funding is provided to government owned and operated depots. In light of defense budget downsizing, it has become more critical than ever to run depots in the most efficient manner possible. The General Accounting Office has recently submitted several reports criticizing DoD for inefficiently managing organic depots.

DoD has tried to adopt a "best commercial practices" approach to improve efficiency of depot maintenance. A key focus of commercial practices is delivering

customer satisfaction. To this extent, it is imperative that DoD depots understand and properly measure their customer's concerns if they wish to improve their performance.

D. METHODOLOGY

The methodology used in this research includes the following steps.

1. We conducted a thorough review of the current customer satisfaction measurement systems at NADEP NI. This was done by survey, questionnaires, and personnel interviews with depot personnel. The current system of measuring customer satisfaction at NADEP NI is described in Chapter II.

2. We conducted a literature search of books, magazine articles, CD-ROM systems, internet sources, and other library information resources that dealt with customer satisfaction. The results of this research can be found in Chapter III.

3. We examined customer satisfaction measurement systems currently in use in the private and public sector. We identified successful examples and lessons learned from both areas. The results of this research can be found in Chapter III.

4. We developed a pretest questionnaire to be sent to the external customers of NADEP NI's F/A-18 aircraft depot maintenance program to identify their expectations, importance factors, and perceptions of performance of depot maintenance. The development of this questionnaire can be found in Chapter IV. For the purpose of this research we consider the depot's external customers to be squadrons, wings, type commanders and the Naval Air Systems Command. The results and analysis of this pretest questionnaire can be found in Chapter V.

5. We examined the customer service issues in the move of F/A-18 depot maintenance from the Navy to the Air Force, and back to the Navy. We concentrated on the lessons learned and how an accurate measuring system of customer satisfaction could have surfaced problems with customer expectations. The results of this research can be found in Chapter II.

6. Finally, we prepared a recommended set of tailored customer satisfaction measures for NADEP NI's F/A-18 aircraft maintenance program with an implementation strategy. This recommendation can be found in Chapter VI.

E. RESEARCH QUESTIONS

The following questions guided this research effort:

1. How is the concept of customer satisfaction relevant to the DoD depots?

2. What current systems are in place to measure customer satisfaction of depot services?

3. What do these systems truly measure?

4. How is the information generated by current measures used and integrated into depot management and decision making?

5. How does customer satisfaction information flow to different levels of the depot's management and work force? Is the information flow timely?

6. How is customer satisfaction measured for similar services provided in the private and public sector?

7. How do different customers (squadron, wing, type commander, systems command) measure depot performance?

8. Are there factors limiting the depot's responsiveness to customer demands?

9. How did customer satisfaction impact the decision to change the venue for F/A-18 depot level maintenance from the Air Force back to NADEP NI?

10. Are there alternative methods of measuring customer satisfaction that would better serve the depot process?

11. How could these alternative measures be best implemented at NADEP NI?

12. What other elements are required to establish an effective feedback loop connecting the depot and its customers?

F. KEY TERMS

The following terms are defined with regard to customer satisfaction and measuring quality in service organizations. This list provides the reader with a point of reference in understanding our research.

1. **Quality** - Fitness for use as defined by the customer or "how well the product or service performs its intended function. " (Hodgkiss & Casipit 1994)

2. **Expected Quality** - What the customer assumes will be received from the product (or service) as a reflection of the customer's needs. (Hodgkiss & Casipit 1994

3. **Perceived Quality** - The customer's measure of satisfaction in the product, the "feel" for its quality. (Hodgkiss & Casipit 1994)

4. **Measure** - "The act or process of ascertaining the extent, dimensions, quantity of something, especially by comparison with a standard." (Random House 1992)

5. **Benchmarking** - "Selecting a demonstrated standard of performance that represents the very best performance for a process or activity." (Heizer & Render 1996)

6. **External Customer** - The customers or users outside of the provider's organization.

7. **Internal Customer** - "The individual or department within the organization that receives the output of another individual or department within the organization." (Hodgkiss & Casipit 1994)

8. **Metric** - "A measurement made over time, which communicates vital information about the quality of a process, activity, or resource." (Random House 1992)

9. **Quality circle** - "A group of employees meeting regularly with a facilitator to solve work-related problems in their work area; initiated by the Japanese in the 1970's." (Heizer & Render 1996)

10. **Quality loss function** - "A mathematical function that identifies all costs connected with poor quality and shows how these costs increase as product or service quality moves [away] from what the customer wants." (Heizer & Render 1996)

11. **Tailoring** - "Making sure that the element measured relates to specific information needs, that it is measurable and that the information is meaningful." (Heizer & Render 1996)

12. **Total Quality Management (TQM)** - "Management of an entire organization so that it excels in all aspects of products and services that are important to the customer." (Heizer & Render 1996)

13. **Trend** - "The general course or prevailing tendency." (Random House 1992)

14. **Target value** - "A philosophy of continuous improvement to produce products or services that are exactly what the customer wants." (Heizer & Render 1996)

15. Efficiency - "The ratio of service quantity output to the amount of input required to produce it." (McLay 1992)

16. Effectiveness - "The degree to which the intended public purposes of a service or activity is being met." (McLay 1992)

17. Productivity - "The enhancement to the production process that results in a favorable comparison of the quantity resources employed (inputs) to the quantity of goods and services produced (outputs)." (McLay 1992)

G. ASSUMPTIONS

The first major assumption of this research is that NADEP NI has a mature and effective continuous quality improvement program. This is a necessary foundation for effectively using the data produced by a customer satisfaction measurement system. A second assumption is that both NADEP NI and its external customers are committed to improving the effectiveness of depot operations. This implies that all organizations involved are willing to commit the necessary resources to support a customer satisfaction measurement program that is part of a continuous quality improvement effort. The third major assumption is that NADEP NI will continue to verify and modify the recommended customer satisfaction program to ensure that it remains an effective tool for quality improvement. A final assumption is that NADEP NI truly wants to measure their customer's satisfaction with NADEP's products and services. Measuring customer satisfaction is often "looking for bad news." The organization must view customer complaints as invaluable data and golden opportunities to improve.

H. CHAPTER SUMMARY

More and more, private industry is measuring quality. Companies are concluding that if they can't measure it, they can't manage it and, consequently, can't improve it. The best performing organizations are allowing customer expectations to drive their quality initiative. They recognize that customers define quality by judging their products and services relative to competitors. Organizations that constantly measure themselves in relation to competitors (benchmarking) are able to quickly capitalize on their emerging strengths and address weaknesses before they become problems. Continuous quality improvement begins by identifying customer expectations for all key interactions between customers and the organization.

Although government agencies are not driven to produce a profit, their survival can hinge on the quality of service they provide. The downsizing budget has forced the government to examine its effectiveness in a hard light. Accurately measuring customer satisfaction has many benefits for government organizations such as: optimizing resource allocation and use to balance customer expectations with departmental mandates and available resources (people, money and time); identifying opportunities for new services and for service adjustment, which could mean continuing, discontinuing, realigning or transferring services; and improving the quality and effectiveness of services.

II. CURRENT MEASURES OF CUSTOMER SATISFACTION AT NADEP NORTH ISLAND

A. NADEP NORTH ISLAND AND THE F/A-18 MAINTENANCE PROGRAM

Naval Aviation Depot North Island (NADEP NI) is one of three NADEPs providing organic depot level maintenance and engineering support to Navy and Marine Corps aircraft. NADEP NI currently employs over 3500 workers with an average of 19 years of experience. (NADEP fact sheet) During the recent Base Realignment and Closure (BRAC) process, the Navy's organic depot workload was redistributed among the three remaining NADEPs. Part of this redistribution was designed to assign a particular NADEP as the "single support site" for each aircraft type in the Navy/Marine Corps inventory. NADEP NI was chosen to be the single site for organic depot support of Navy and Marine Corps F/A-18 aircraft. In practice, however, NADEP Jacksonville, FL (NADEP JAX) still performs some F/A-18 maintenance.

Within NADEP NI, F/A-18 related workload falls under the responsibility of the depot's F/A-18 Program Management Team Office (PMTO), with the exception of component overhaul and repair. NADEP NI is a matrix "competency aligned" organization. In other words, only a small number of NADEP employees performing F/A-18 work report directly to the PMTO. Most report to various "competency managers" who assign them to work on specific programs. A diagram of NADEP NI's management structure can be seen in Figure 2-1.

Several F/A-18 workload elements are controlled by NADEP's F/A-18 PMTO. The largest of these, in terms of cost and manhours consumed, is a scheduled maintenance

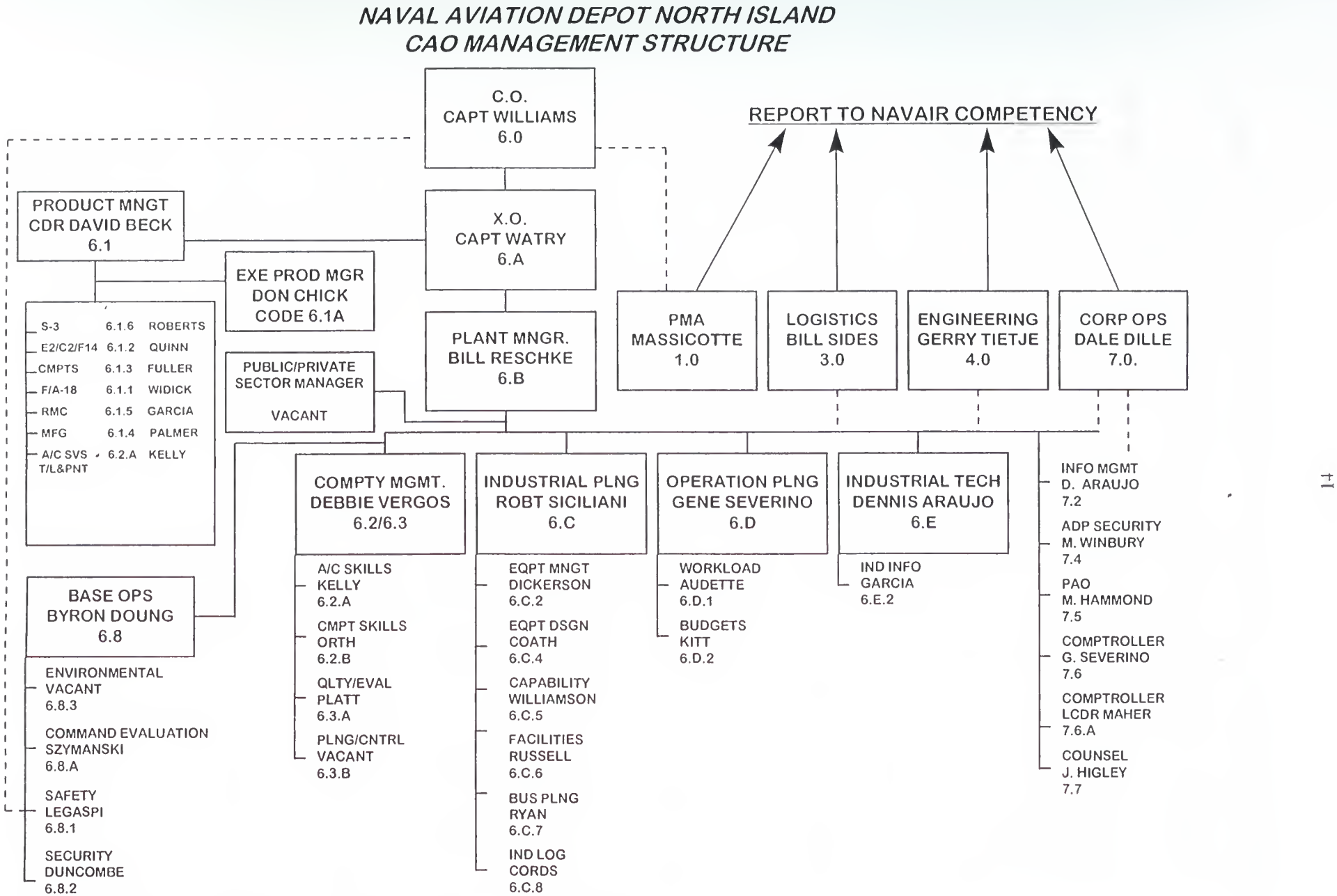


Figure 2-1. NADEP North Island Competency Aligned Organization

program called the Modification, Corrosion and Paint Program (MCAPP). In FY 97, 62 F/A-18 aircraft belonging to both Pacific and Atlantic fleet type commanders, and assigned to various U.S. Navy and Marine Corps squadrons, are planned to complete the MCAPP process at NADEP NI. In addition to MCAPP, NADEP NI also performs in-service repair (ISR) of damaged F/A-18 aircraft and both on-site aircraft repairs and depot level modifications through field teams.

NADEP NI has permanent field teams located at Naval Air Station (NAS) Lemoore, CA, Marine Corps Air Station (MCAS) El Toro, CA and NAS Fallon, NV. Some F/A-18 depot level maintenance at NAS Cecil Field, FL is performed by field teams from NADEP Jacksonville, FL due to their close proximity. These field teams perform three important functions. First, they incorporate a variety of depot level modifications into aircraft at the customer site. This process is usually referred to as "drive-in modification" (DIM). The second function is in-service repair of damaged aircraft. The third function is Paint and Corrosion Evaluation (PACE) inspections. These inspections determine if an aircraft requires MCAPP . Temporary field teams are organized and dispatched to other F/A-18 operational sites, as required, including deployed aircraft carriers.

B. THE F/A-18 MAINTENANCE CONCEPT AND MCAPP

The F/A-18 maintenance concept emphasizes "on condition" maintenance. Rather than perform scheduled maintenance tasks at a particular flight hour or calender milestone, on condition maintenance is performed as needed, i.e. - when the aircraft or an aircraft sub-system has reached a degraded material condition. This concept extends to depot

level maintenance as well. Two important factors drove the F/A-18 aircraft to this maintenance concept. The first is cost. In the long run, a well designed on condition maintenance program will reduce life-cycle support costs for the aircraft compared to a scheduled maintenance program. Unnecessary maintenance will be minimized. The second factor is related to the structural design of the F/A-18 aircraft. Certain areas of the aircraft were not designed to be disassembled and reassembled without compromising the aircraft's strength and fatigue life. Unnecessary depot level maintenance will shorten the aircraft's service life.

The F/A-18 aircraft's on condition maintenance philosophy required a different approach to depot maintenance than used with other naval aircraft. The resulting unique depot maintenance program is MCAPP, which is described in NAVAIR F/A-18 MCAPP dated 31 Jan 1996. Aircraft are flown to the depot to go through MCAPP, which currently takes an average of 108 calender days at NADEP NI. While in MCAPP, a variety of technical directives (TDs) and modifications are incorporated into the aircraft depending on the particular aircraft model (there are four different F/A-18 models; A, B, C and D models) and aircraft lot number (current production aircraft are Lot 18). Specific corrosion prone areas of the aircraft are "opened up," any corrosion damage treated and/or repaired, and the aircraft's paint system is restored. During MCAPP or ISR, the depot does not fix minor discrepancies found which are not included in the MCAPP specification, unless they affect the aircraft's airworthiness. To determine when an F/A-18 aircraft requires MCAPP, the aircraft undergoes an inspection called the Paint and Corrosion Evaluation (PACE). The content and conduct of this inspection is governed by a NADEP NI Local Engineering Specification (LES). An aircraft gets its first PACE

inspection after about four years in service. If the aircraft passes the PACE inspection (score of 45 points or lower on the PACE Corrosion Evaluation Discrepancy/History Report form) the aircraft remains in service for another 12 months, at which time it receives another PACE inspection. The point score of the next PACE inspection is added to the scores of the aircraft's previous PACE inspections. Once the score exceeds 45 points, the aircraft is scheduled by the type commander for MCAPP induction. PACE inspections are performed by NADEP personnel at the squadron site. While NADEP NI performs PACE inspections on west coast based F/A-18s, NADEP JAX has historically performed PACE inspections on east coast based aircraft. This arrangement has reduced consistency in judging aircraft material condition. NADEP NI hopes to perform all future PACE inspections, to improve consistency. Also towards this end, most NADEP NI PACE inspections at the Navy's largest F/A-18 base (NAS Lemoore, CA) are performed by the same individual.

Reporting custodians (squadrons) are notified by the type command staffs of MCAPP induction dates. Prior to sending the aircraft to depot for MCAPP, the squadron sends an MCAPP Special Work Request message to the depot identifying required depot level TDs and another items requiring special rework not covered by the standard MCAPP work specification. In practice, though, few special rework items are requested by squadrons.

When the aircraft is about mid-way through MCAPP, NADEP NI sends an MCAPP Evaluation Report message to NAVAIR and the type commander, with an information copy to the type wing and squadron. This message identifies which TDs will actually be incorporated into the aircraft and explains why any requested TDs or special

rework items will not be performed. This message also identifies whether the number of manhours to perform the MCAPP work on the aircraft falls within the depot's preestablished norms, or whether additional manhours need to be approved by the type command staff.

Upon completing MCAPP, the aircraft usually returns to the same squadron (greater than 90 percent of the time). This is not the case with some other type aircraft scheduled depot level maintenance (SDLM) programs, and results largely from the short MCAPP turnaround time (relative to other type aircraft SDLM programs). This is an important advantage for the F/A-18 community for two reasons. First, there are a great number of configuration differences between different aircraft lot numbers. This makes it difficult to move aircraft around between squadrons, for aircrew training and support reasons. The second advantage of getting the same aircraft back from MCAPP is that the squadron can better assess the quality of work done by the depot and gauge any readiness or performance improvement.

Aircraft are flown back to the squadron's location by one of the depot's test pilots. Though these pilots interact directly with the squadron's maintenance personnel and provide NADEP some customer feedback, they normally return to the depot before the squadron completes their aircraft acceptance inspections. On its return to the squadron, the aircraft is required to undergo an acceptance inspection and a functional check flight (FCF). This acceptance process normally takes about 3 working days, after which the aircraft can usually be scheduled for normal squadron use. NADEP NI occasionally has repot representatives remain with the squadron through the entire acceptance/FCF

process, to better understand what the squadron must do to return the aircraft to regular flight status.

After completing the acceptance/FCF process, the squadron submits an Aircraft Discrepancy Report (ADR) to the depot, even if no discrepancies are noted by the squadron. This reporting requirement, spelled out in OPNAVINST 4790.2F, uses Standard Form 368, the form used for Category 2 Quality Deficiency Reports.

Slots for MCAPP induction are controlled by the staffs of the two type commanders, Commander U.S. Air Forces Pacific Fleet (COMNAVAIRPAC) and Atlantic Fleet (COMNAVAIRLANT). Currently each type command is allocated eight MCAPP slots per quarter. This allocation is a function of estimated needs and available funds for depot maintenance, as negotiated between the type commanders and NAVAIR Code 6.0 (AIR 6.0). All of the commands involved in the F/A-18 depot maintenance process, above the squadron level, gather quarterly at different sites for the F/A-18 Modification Management Meeting. At these meetings, F/A-18 issues are discussed and negotiated, including MCAPP slots, MCAPP content, drive-in modification program content, and future depot maintenance requirements.

C. THE IMPORTANCE OF PLEASING CUSTOMERS AT NADEP NI

NADEP NI's mission statement begins with the statement:

> As a full-service, world class depot, we will continue to excel at our principle product - diverse support - providing our customers with the highest quality at the best value.

The second of the depot's nine Guiding Principles is:

Customers - We are sensitive and responsive to the needs of both our internal and external customers. Our existence depends on their satisfaction. Success is when our customers brag about us.

These words are much more than a slogan among NADEP NI's employees, especially those connected with the F/A-18 program. These depot employees know the consequences of not performing up to customer expectations.

To drive down costs and improve schedule performance, the Navy competed its F/A-18 MCAPP workload in 1992. The competition was open to both public and private offerers. If all options of the proposed 4 year contract were exercised, the total workload was valued at about $61 million. (GAO 96-31) Bids were received from two private contractors, NADEP NI and the Air Force's Ogden Air Logistics Center in Ogden, Utah. The Air Force's bid was significantly lower than the others and they were awarded the contract. The Air Force received their first F/A-18 for MCAPP in December 1993. The Air Force wanted to be designated as the single site for F/A-18 MCAPP but the Navy decided (with Office of the Secretary of Defense approval) that it needed to maintain a core F/A-18 repair capability at a Navy depot. Over the next 11 months, the Air Force inducted 36 F/A-18s for MCAPP and NADEP NI inducted 34. MCAPPs were then being performed by two DOD depots, in head to head competition.

As a result of losing a major portion of its F/A-18 workload, NADEP NI vigorously examined their processes and reengineered them to reduce cost and turnaround time. The improvements at NADEP NI were tremendous. NADEP NI's average turnaround time for aircraft completing MCAPP in FY 1994 was 269 days. By early

FY 1995, NADEP NI was consistently completing MCAPP in under 110 days. The Air Force had bid to complete MCAPPs in 143 days. They delivered their first aircraft on time, but all subsequent aircraft were delivered from 17 to over 200 days late. The Air Force felt the Navy was responsible for most of the schedule delays, as they depended on the Navy to provide parts and engineering dispositions. Regardless, the Navy decided that NADEP NI's schedule performance was better and that there were economic advantages to having only one site do all the MCAPPs. In December 1994, the Navy chose not to exercise the second year contract option and consolidated all MCAPP workload back at NADEP NI. (GAO 96-31)

D. NADEP NI'S EXTERNAL CUSTOMERS

Typical of many large government organizations, NADEP NI has a variety of external customers. Just within NADEP's F/A-18 Program there are four different types of external customers. These are the squadrons, the wing staffs, the type commander staffs, and the Naval Air Systems Command (AIR 6.0) personnel. Though all of these customers share some general concerns about cost, schedule and quality, they have unique perspectives, concerns and interactions with the depot. One of the main purposes of this thesis is to differentiate the factors that govern satisfaction for each of the four types of customers and to establish their relative importance for each customer.

The Navy and Marine Corps F/A-18 squadrons who "own" the aircraft are the depot's most obvious customers. While researching this thesis at NADEP NI, and talking with a cross section of depot employees, we were told by most that the squadrons, or "the fleet," were the depot's most important customer. Additionally, we were told that of all

fleet," were the depot's most important customer. Additionally, we were told that of all the depot's customers, the squadrons were probably the easiest to please, largely because they least understood exactly what the depot does. This is particularly true of MCAPP, where often the only visible evidence of work performed at the depot is the aircraft's new paint job.

F/A-18 program personnel at the depot said that they generally did not receive enough feedback from squadrons concerning the depot's performance. Direct squadron interaction with the depot is limited. The squadrons' most important depot point of contact is usually the local NADEP field team leader. This individual is the squadrons' point of contact for ISR work, drive-in modifications, and PACE inspections. Once an aircraft has been sent to the depot for MCAPP, squadrons often obtain status information second hand from the type wing staff, although NADEP encourages squadrons to call them or access schedule information directly on the depot's electronic bulletin board system. Squadrons play no role in paying or accounting for depot maintenance funds.

The next level of NADEP NI customers is the type wing staffs. On the west coast, the Navy F/A-18 type wing is Commander, Strike Fighter Wing Pacific (CSFWP) based at NAS Lemoore, CA. On the east coast, the Navy F/A-18 type wing is Commander, Strike Fighter Wing Atlantic (CSFWL) based at NAS Cecil Field, FL. Marine Corps squadrons are grouped in composite wings, like Navy carrier air wings, with multiple aircraft types in each wing. Marine Corps F/A-18s on the west coast belong to the Third Marine Air Wing, based at MCAS Miramar, CA. Depot coordination functions for the wing are performed by the attached Marine Aviation Logistics Squadron 11 (MALS 11). Marine Corps F/A-18s on the east coast belong to the Second Marine Air Wing, based at MCAS

Beaufort, SC. Depot coordination functions for the wing are performed by the attached Marine Aviation Logistics Squadron 31 (MALS 31).

The Navy type wing staffs and Marine Corps MALS maintenance officers are responsible for ensuring that their squadrons have sufficient aircraft in proper material condition to meet their training and operational commitments. NADEP serves them by producing MCAPP aircraft on schedule, so the wing can deploy fully equipped squadrons without having to transfer aircraft among squadrons. The wings are heavily involved in coordinating depot level modification programs for their squadrons. They also serve as coordinators for the depot's on-site drive-in modification programs. However, the wings do not pay for depot services. Nevertheless, they are aware of funding issues because they attend quarterly Modification Management Meetings and interact frequently with the depot and the type commander staffs.

The next level of NADEP NI customers are the three type commander staffs. They are: Commander, Naval Air Forces Pacific Fleet (CNAP) in San Diego, CA; Commander, Naval Air Forces Atlantic Fleet (CNAL) in Norfolk, VA; and Commander, Naval Air Reserve Force (CNAR) in New Orleans, LA. The type commander staffs are integrated Navy and Marine Corps activities. The type commander, a three star flag billet, is the aircraft controlling custodian. With only a few small exceptions, all Naval and Marine Corps aircraft belong to one of the three type commanders for administrative purposes. The type commander staff controls and directs aircraft transfers between reporting custodians (squadrons). Each type commander staff has two desks that interface with the depot on F/A-18 matters. These are the F/A-18 Class Desk and the Depot coordinator. The Class Desk is the focal point on the type commander staff for all F/A-18

issues. The Depot Coordinator is primarily concerned with "big picture" aircraft inventory management and funding of depot maintenance within the type command. The Depot Coordinator manages the type commander's depot budget, which is an annual allocation from AIR 6.0. Rework needs, priorities and funds are matched within the type command by these two desks working together. As funding for depot maintenance is very constrained, the type commander staffs and AIR 6.0 often renegotiate funding allocations between type commands based on need. The type commander staffs also must go to AIR 6.0 for over and above funding on MCAPP aircraft that require more than 10 percent additional manhours than allowed by the MCAPP work standard.

The final level of NADEP NI's customers considered in this thesis is the Naval Air Systems Command (NAVAIR) headquarters. NAVAIR is responsible for developing, procuring, supplying, and supporting all aviation systems, related equipment, and services required by the Navy and Marine Corps. (NAVAIR homepage) The specific part of NAVAIR that manages aviation depot issues is AIR 6.0, the Assistant Commander for Industrial Capabilities. AIR 6.0 makes policy decisions concerning the NADEPs, including apportioning workload between the NADEPs, other government depots and commercial repair facilities. As stated above, AIR 6.0 allocates funds for depot maintenance to the type commanders and controls over and above funding. AIR 6.0 also works closely with the other parts of NAVAIR, such as AIR 3.0 (Logistics) and AIR 4.0 (Engineering), in determining depot maintenance requirements and the best ways to perform them. As a depot customer, NAVAIR is concerned primarily with cost effective lifecycle aircraft support. Due to declining depot maintenance funds, NAVAIR is always looking for ways to reduce the cost of depot maintenance, while gaining the maximum

readiness benefit from depot dollars spent. Depot turnaround time is also a NAVAIR concern. If the Navy can plan on a shorter turnaround time for depot maintenance, they can buy fewer aircraft and still achieve the same fleet readiness.

E. CUSTOMER SATISFACTION MEASUREMENT AT NADEP NI

Customer satisfaction at the depot is measured at the individual program level. Several people within the F/A-18 PMTO at NADEP NI are measuring and tracking various aspects of customer satisfaction. Overall responsibility is informally assigned to the program's Quality Competency Manager. Several tools are in place to measure and track F/A-18 program quality performance. Some of these are direct measures of customer satisfaction and others are related indirectly to customer satisfaction.

The direct measures of customer satisfaction currently used by NADEP NI's F/A-18 program are Aircraft Discrepancy Reports (ADRs), a self-developed squadron customer survey and a derived customer satisfaction index referred to as the GPA (grade point average).

As stated previously, squadrons are required to submit an ADR, following their acceptance inspection, on aircraft received back from the depot. Reports must still be sent, even if there are no discrepancies. In theory, the depot should receive an ADR on every aircraft they process through MCAPP or major ISR work; in some cases ADRs are not sent by the squadron.

The ADR uses Standard Form 368, the same form used for Category 2 Quality Deficiency Reports. As a result, the form does not provide optimum customer feedback on the depot. Instructions for filling out the ADR are located in OPNAVINST 4790.2F.

the depot. Instructions for filling out the ADR are located in OPNAVINST 4790.2F. Squadrons may only list legitimate "discrepancies," classified into one of three categories: Critical, Major, or Minor. A copy of Standard Form 368 is shown in Figure 2-2. The F/A-18 PMTO responds to any ADR noting a discrepancy. The PMTO's Quality Competency Manager immediately contacts the squadron by telephone to inform the squadron that NADEP has received the alleged discrepancy and to gain additional information from the squadron. After investigation by NADEP NI quality assurance personnel, the ADR discrepancy is either confirmed or rejected, and the squadron is notified in writing, with a copy to AIR 6.0. If the discrepancy is confirmed, any corrective actions taken are noted in the response. The F/A-18 PMTO tracks the number of confirmed ADR discrepancies and publishes this information in a series of three charts. Examples are shown in Figures 2-3, 2-4 and 2-5. These CS measures are some of several F/A-18 program performance charts posted in a highly visible, central location at NADEP NI. Copies of the actual ADR reports and responses are posted on clipboards in work areas for the depot's artisans and supervisors to read.

The second direct CS measure currently used by NADEP NI, a "Quality Process Improvement Questionnaire," is also targeted to the squadron level customer. This questionnaire is provided to the squadron as part of the aircraft's logbook package, on return from MCAPP or major ISR work at NADEP NI. The questionnaire is divided into three sections. The first section asks the squadron to assign a numerical grade from zero to four for various attributes of the aircraft's condition on return from the depot. The second part asks the squadron to assign a numerical grade using the same scale for

PRODUCT QUALITY DEFICIENCY REPORT ☐ CATEGORY I ☐ CATEGORY II

1a. FROM *(Originator)*			2a. TO *(Screening point)*		
1b. NAME, TELEPHONE NO. AND SIGNATURE		1c. DATE	2b. NAME, TELEPHONE NO. AND SIGNATURE		2c. DATE
3. REPORT CONTROL NO.	4. DATE DEFICIENCY DISCOVERED	5. NATIONAL STOCK NO. (NSN)	6. NOMENCLATURE		
7a. MANUFACTURER/CITY/STATE	7b. MFRS. CODE	7c. SHIPPER/CITY/STATE		8. MFRS. PART NO.	
9. SERIAL/LOT/BATCH NO.	10a. CONTRACT NO.	10b. PURCHASE ORDER NO.	10c. REQUISITION NO.	10d. GBL NO.	
11. ITEM ☐ NEW ☐ REPAIRED/ OVERHAULED	12. DATE RECD., MFRD, REPAIRED, OR OVERHAULED	13. OPERATING TIME AT FAILURE	14. GOVERNMENT FURNISHED MATERIAL ☐ YES ☐ NO		
15. QUANTITY	a. RECEIVED	b. INSPECTED	c. DEFICIENT	d. IN STOCK	
16. DEFICIENT ITEM WORKS ON/WITH a. END ITEM *(Aircraft, mower, etc.)*	(1) TYPE/MODEL/SERIES			(2) SERIAL NO.	
b. NEXT HIGHER ASSEMBLY	(1) NATIONAL STOCK NO. (NSN)	(2) NOMENCLATURE	(3) PART NO.	(4) SERIAL NO.	
17. UNIT COST $	18. ESTIMATED REPAIR COST $	19a. ITEM UNDER WARRANTY ☐ YES ☐ NO ☐ UNKNOWN	19b. EXPIRATION DATE		

20. WORK UNIT CODE/EIC *(Navy and Air Force Only.)*

21. ACTION/DISPOSITION

☐ HOLDING EXHIBIT FOR_____ DAYS ☐ RELEASED FOR INVESTIGATION ☐ RETURNED TO STOCK ☐ DISPOSED OF ☐ REPAIRED ☐ OTHER *(Explain in Item 22)*

22. DETAILS *(Describe, to best ability, what is wrong, how and why, circumstances prior to difficulty, description of difficulty, cause, action taken, including disposition, recommendations. Attach copies of supporting documents. Continue on separate sheet if necessary.)*

23. LOCATION OF DEFICIENT MATERIAL

24a. TO *(Action Point)*		25a. TO *(Support Point)* *(Use Items 26 and 27 if more than one)*	
24b. NAME, TELEPHONE NO. AND SIGNATURE	24c. DATE	25b. NAME, TELEPHONE NO. AND SIGNATURE	25c. DATE
26a. TO *(Support Point)*		27a. TO *(Support Point)*	
26b. NAME, TELEPHONE NO. AND SIGNATURE	26c. DATE	27b. NAME, TELEPHONE NO. AND SIGNATURE	27c. DATE

368-102
NSN 7540-00-133-5541

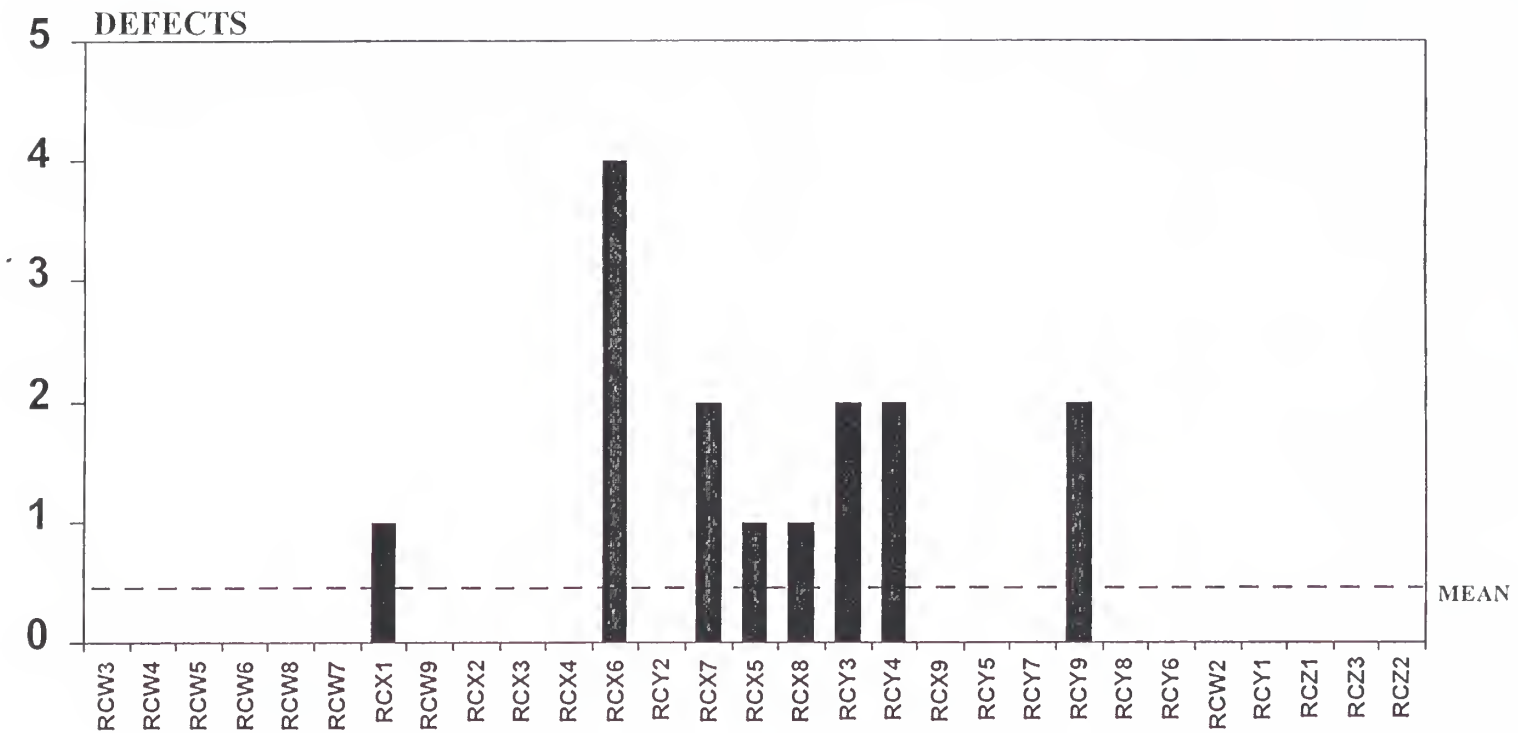
STANDARD FORM 368 (REV. 10-85)
GENERAL SERVICES ADMINISTRATION
(FPMR 101-26.8)

Figure 2-2. Standard Form 368 (front)

EXTERNAL QUALITY

F/A-18 COMPLETED MCAPP AIRCRAFT CONFIRMED ADR DEFECTS PER AIRCRAFT

4TH QTR FY 96 TO DATE



04/29/97

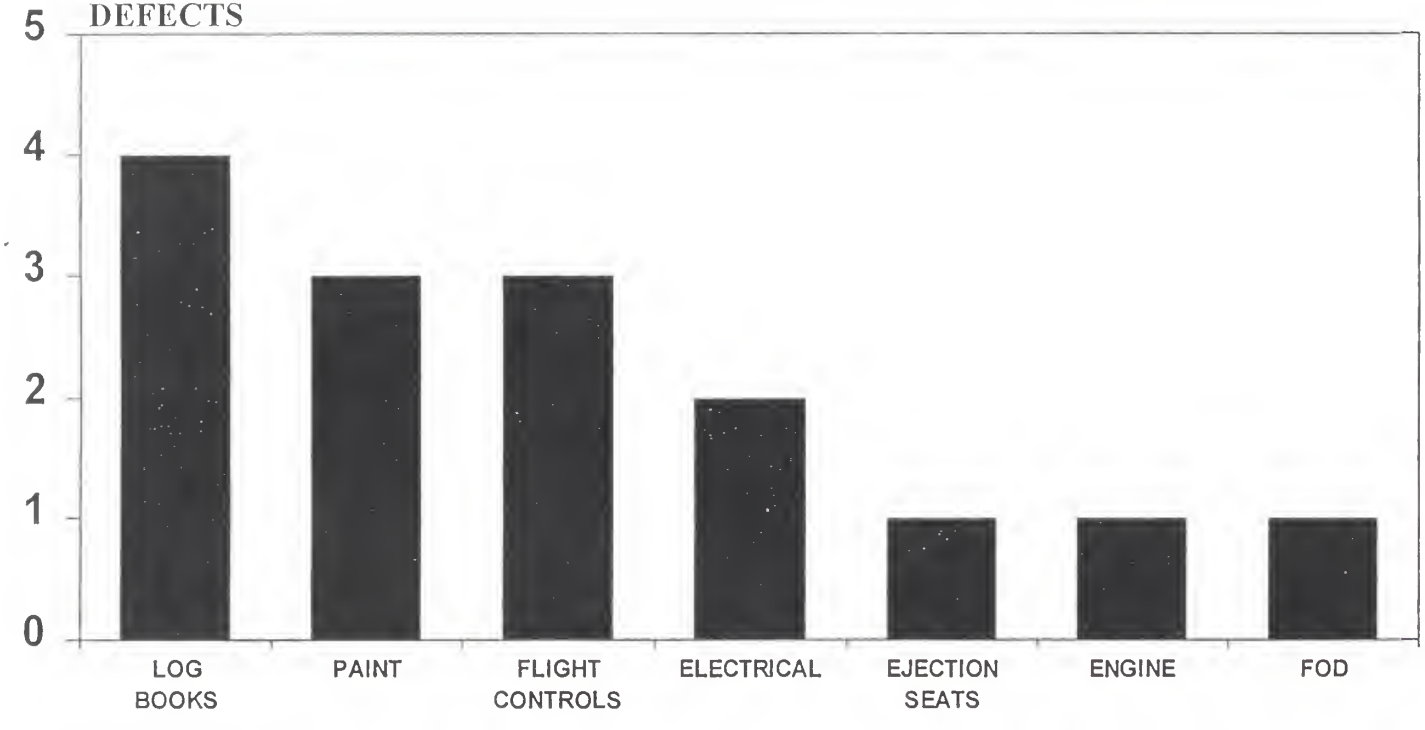
NOTE: SEQS WITHOUT BARS REPRESENT ZERO DEFECT AIRCRAFT

Figure 2-3. F/A-18 PMTO Confirmed ADR Defects per Aircraft Chart

EXTERNAL QUALITY

F/A-18 COMPLETED MCAPP AIRCRAFT CONFIRMED ADR DEFECTS BY TYPE

4TH QTR FY 96 TO DATE



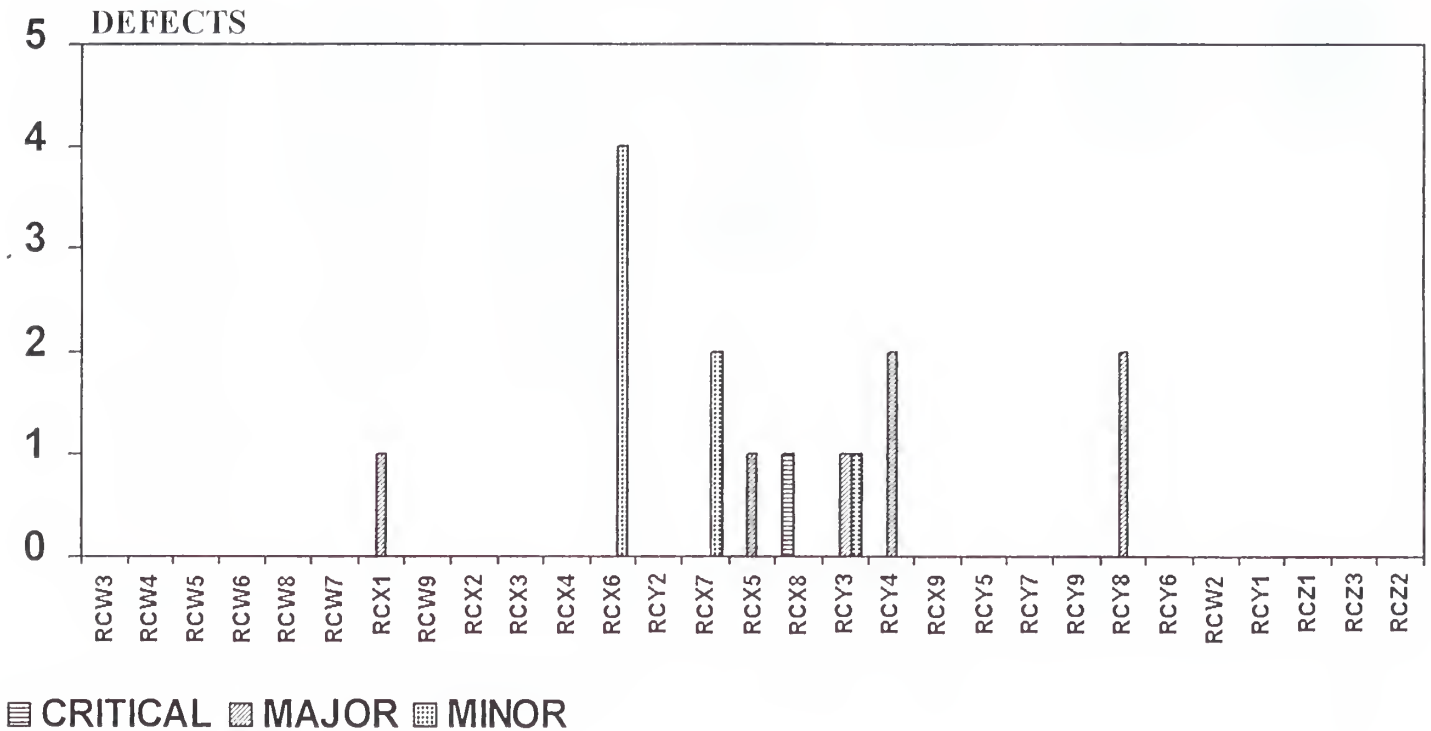
04/29/97

Figure 2-4. F/A-18 PMTO Confirmed ADR Defects by Type Chart

EXTERNAL QUALITY

F/A-18 COMPLETED MCAPP AIRCRAFT SEVERITY OF CONFIRMED ADR DEFECTS

4TH QTR FY 96 TO DATE



AIRCRAFT SEQUENCE NO.

04/29/97

NOTE: SEQS WITHOUT BARS REPRESENT ZERO DEFECT AIRCRAFT

Figure 2-5. F/A-18 PMTO Severity of Confirmed ADR Defects Chart

different attributes of the depot's customer assistance/service. The third section asks the squadron to write in any general comments or recommendations. A self addressed stamped envelope is provided with the questionnaire to facilitate its return to the depot. Despite this, not all questionnaires are returned. The questionnaire also has a block for the squadron to check if they would specifically like a phone response from the depot to any of their comments. One problem identified with the questionnaire concerns who in the squadron fills it out. The questionnaire does not specify or recommend a particular respondant within the squadron. As a result, data received is inconsistent and may come from a respondant within the squadron who's not cognizant of all the squadron's quality concerns. Copies of the returned questionnaires are also posted on clipboards in work areas for the depot's artisans and supervisors to read. A copy of NADEP's Quality Process Improvement Questionnaire is shown in Figure 2-6.

A third direct CS measure currently used by NADEP NI is a composite CS index referred to as the GPA (grade point average). It is used to assess CS trends. A GPA score is obtained from each Quality Process Improvement Questionnaire returned to NADEP NI. The GPA score is the arithmetic average of the scores given by the squadron to the eight attributes relating to the aircraft's condition in Section A of the questionnaire. Figure 2-7 is a copy of the F/A-18 PMTO's GPA chart. As can be seen in Figure 2-7, the scores are plotted over time, using NADEP's aircraft sequence number. A simple linear regression line is also included in the chart.

Several indirect measures of customer satisfaction are currently used by NADEP NI's F/A-18 PMTO. Schedule and internal quality are the focus of most of these measures. Schedule measures focus on meeting or beating the 110 day turnaround time

QUALITY PROCESS IMPROVEMENT QUESTIONNAIRE

This questionnaire provides NAVAL AVIATION DEPOT NORTH ISLAND with invaluable information from the F/A-18 community. The feedback you provide will be used for our continuous process improvements efforts. If you have any questions concerning the aircraft you have received or, if there are any other services we can provide , please contact our F/A-18 PMTO office at DSN 735-4821 or COMMERCIAL (619) 545-4821, FAX # 735-3569.

LEGEND

POOR——— 0
FAIR——— 1
AVERAGE——— 2
VERY GOOD——— 3
EXCELLENT——— 4

* BUNO. _____ NI SEQ NO. _____

* DATE RECEIVED FROM NADEP NI MCAPP/AEPD _____

A. AIRCRAFT CONDITION: PLEASE ENTER A CHECK MARK IN EACH COLUMN WHICH BEST REPRESENTS EACH CONDITION ELEMENT.

	0	1	2	3	4
(1) ELECTRICAL: (Wiring Integrity, Condition, Security)----------					
(2) AVIONICS: (WRA Security)----------					
(3) POWER PLANTS: (Installation, Rigging, Security)----------					
(4) FLIGHT CONTROLS: (Installation, Rigging, Operations)----------					
(5) EXTERIOR PAINT: (Provides Protection IAW NA 01-1A-509 requirements, Appearance)----------					
(6) INTERIOR: (General Security, Cleanliness)----------					
(7) LOG BOOKS: (Depot Entries, Completeness, Accuracy)----------					
(8) OVERALL CONDITION OF THE AIRCRAFT: (Workmanship)-----					

*** HAVE YOU NOTICED ANY IMPROVEMENT IN THIS A/C AS COMPARED TO PREVIOUS MCAPP/AEPD ACFT? YES ____ NO ____**

B. CUSTOMER ASSISTANCE/SERVICES:

	0	1	2	3	4
(1) Did a NADEP NORTH ISLAND QUALITY REPRESENTATIVE assist your squadron with liaison services when you received your aircraft from MCAPP/AEPD? If so, how do you rate his/her efforts?–					
(2) NADEP NORTH ISLAND RESPONSES to ADR/QDR's----------					
(3) NADEP RESPONSES TO EI requests.----------					
(4) General responses and follow through to your needs.----------					

C. GENERAL COMMENTS/RECOMMENDATIONS: _____

_____

_____

_____

POC:_____ RANK:_____

ACTIVITY:_____ PHONE:_____

PHONE RESPONSE REQUESTED _____ YES _____ NO _____

When completed, please return to:

Commanding Officer Naval Aviation Depot, Code 54200
Naval Air Station, Bldg 94
P.O. Box 357058 San Diego, Ca. 92135-7058

(A PRE-ADDRESSED ENVELOPE HAS BEEN PROVIDED)

Figure 2-6. F/A-18 PMTO Quality Process Improvement Questionnaire

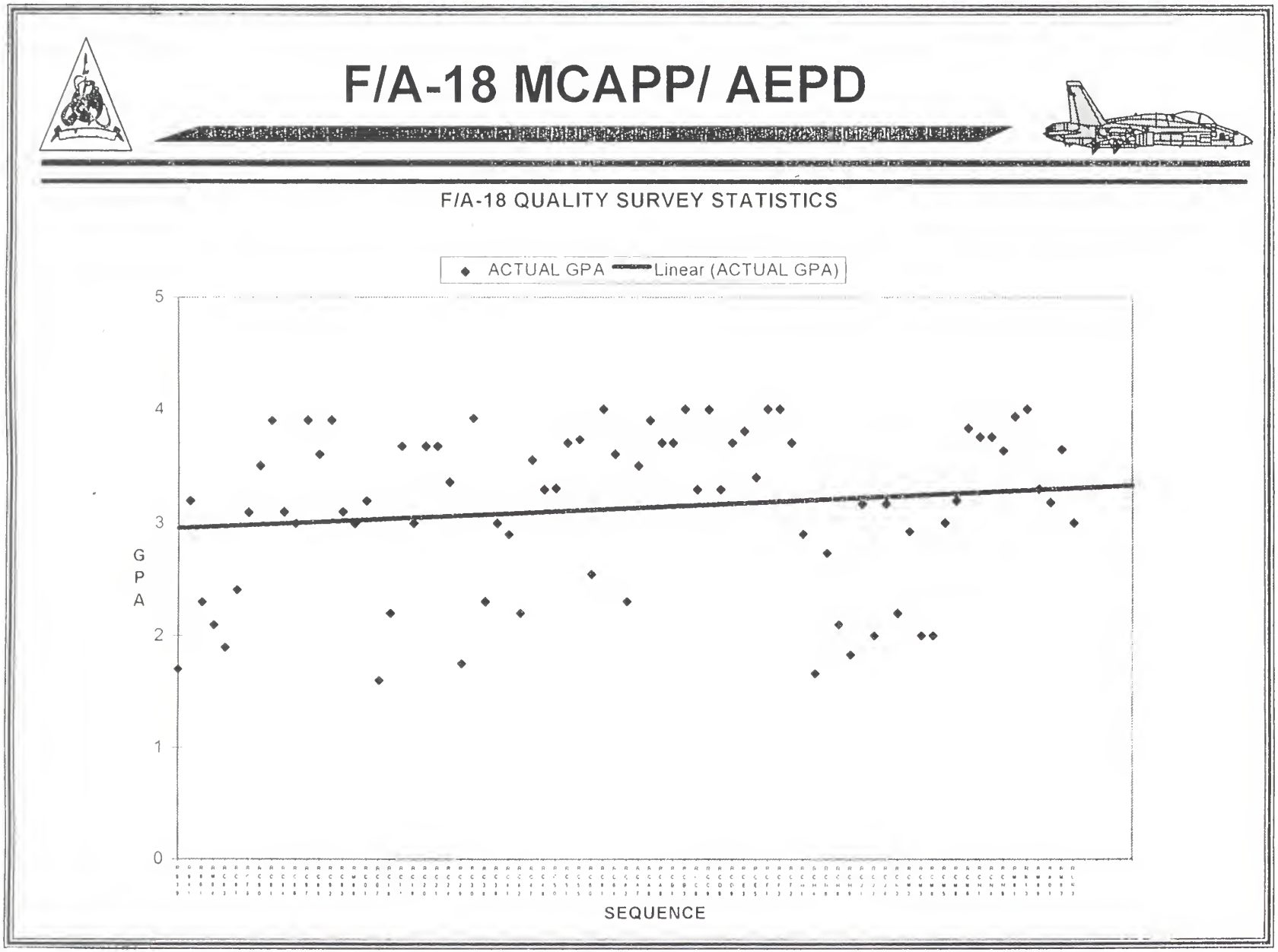


Figure 2-7. F/A-18 PMTO GPA Chart

standard set for MCAPP at NADEP NI. One internal quality measure tracks, by aircraft, the number of work orders written up by quality assurance personnel (known as Discrepancy Work Orders or DWOs) while inspecting finished tasks. Another internal quality measure tracks the number of required maintenance actions written up and manhours of work performed by NADEP NI's flight line maintenance personnel to get the aircraft in flyable condition after MCAPP or major ISR work. Like the direct CS measures, charts displaying NADEP's performance in these areas are posted in a highly visible, central location.

NADEP NI uses customer satisfaction information mostly for problem identification and process improvement. At this time, there is no formal link between any customer satisfaction measures and employee rewards or incentives. Customer satisfaction performance is factored indirectly into some performance evaluations and awards.

F. CUSTOMER INTERFACING AT NADEP NI

Interviews with several key managers within NADEP's F/A-18 PMTO stressed the importance they place on talking to customers, both in meetings and informally by telephone. They saw this as a major part of how they gauge customer satisfaction. F/A-18 PMTO managers meet face to face with wing, type commander and AIR 6.0 personnel at least quarterly at the F/A-18 Modification Management Meetings. Face to face contact with the squadrons is primarily accomplished by NADEP's on site field team personnel and NADEP's delivery pilots when returning an aircraft to the squadron. The PMTO staff felt that it was easy for all levels of customers to complain ("Just pick up the

phone"). They also believed that most customer concerns were received and handled via telephone conversations with various members of the PMTO staff. Though customer concerns voiced formally at meetings are tracked with normal action item procedures, there is no system within the PMTO to record, track and follow up customer issues identified informally or via telephone. The PMTO does not provide a single point of contact for customers to call.

NADEP NI provides performance and schedule information to customers in several ways. Individual requests for aircraft status or other information are handled as received. The PMTO briefs MCAPP schedule performance at the F/A-18 Modification Management Meetings. Actual cost and schedule data for completed aircraft are entered into NAVAIR's Naval Aviation Logistics Data Analysis (NALDA) database. NALDA reports, in various standard and custom formats, can be obtained from AIR 3.1. In-process aircraft schedule information can be obtained from the PMTO's Logistics Action Status Tracking (LAST) system. LAST is a tool designed by the PMTO to provide their customers with updated schedule information concerning any F/A-18 aircraft in house for either MCAPP or in-service repair. LAST is a computer bulletin board, updated by the F/A-18 PMTO once every two weeks. Interested customers can obtain passwords by contacting the F/A-18 PMTO at NADEP NI.

G. CONCLUSION

NADEP NI's F/A-18 PMTO is commited to improving their performance by better understanding and measuring customer satisfaction. This is not a simple task. The PMTO has several different levels of customers. Not all customers share the same concerns, and

the customers are geographically dispersed. The PMTO's current CS measurement system focuses almost entirely on the squadron level customer and the MCAPP/major ISR product. An ideal set of CS measures for NADEP NI's F/A-18 PMTO would include all external customers and all PMTO products, including field teams and engineering support. For such a tool to "pay its way," CS measurement results should be integrated into PMTO decision making and reward systems.

III. LITERATURE REVIEW

A. INTRODUCTION

The purpose of our literature review is to establish a thorough understanding of customer satisfaction before attempting to develop a measurement system for NADEP NI. Specifically, this literature review discusses award winning customer focused organizations, establishes the need to measure customer satisfaction, examines current customer satisfaction measurement methods, presents preconditions to measuring customer satisfaction and sets general guidelines for measuring customer satisfaction.

B. CUSTOMER FOCUSED ORGANIZATIONS

A basic tenet of total quality management is a focus on the customer as the only significant arbiter of the quality of an organization's output. Accepting this, it becomes critical to the organization's success to determine how the products and services provided by the organization are valued by its customers. From this springs the science of customer satisfaction measurement (CSM). The theoretical and practical importance of CSM is widely accepted in the private/for profit sector, as illustrated by the amount of time and money spent by businesses on CSM, the number of CSM consultants currently offering their services, and the weight allotted to CSM programs by the prestigious Malcolm Baldridge National Quality Award. The public/government sector, including DoD, is also beginning to recognize the importance of CSM.

A 1994 thesis by Casipit and Hodgkiss documented in-depth the CSM practices of several quality award winning organizations, both in the private and public sectors. Two of the public sector organizations they examined are similar in many aspects to NADEP NI. These are the U.S. Air Force's Arnold Engineering Development Center (AEDC) and Naval Aviation Depot, Cherry Point, N.C. Both these organizations have well developed CSM programs integrated with their operations.

AEDC is the world's largest aerospace ground test facility. AEDC "conducts tests, engineering analyses, and technical evaluations for research, development and operational programs of the Air Force, DOD, other government agencies, and industry." (Federal Quality Institute 1993) Despite DOD downsizing, AEDC has managed to grow as a result of its TQM based philosophy. AEDC's primary objectives are all directly related to customer satisfaction:

- Achieve 100% of test objectives 95% of the time.
- Meet test start dates 90% of the time.
- Complete 95% of all test projects at or below estimated cost.
- Reduce the average customer test cost by 10 % over the next two years.
- Meet customer expectations as evidenced by an average rating of 5.0 out of a possible 6.0 on a customer survey. (Federal Quality Institute 1993)

AEDC's "objectives have built-in performance measures or metrics which are direct indicators of mission performance." (Hodgekiss & Casipit 1994) These goals and metrics were all developed after consultation with customers to determine what they considered important. These goals, widely publicized throughout the organization, have the added benefit of reinforcing customer-focused behavior by all employees. (Hodgekiss & Casipit 1994) AEDC measures customer satisfaction both indirectly, by monitoring its performance against organizational goals, and directly by means of a customer survey. Every AEDC customer is asked to complete the survey. AEDC's customer satisfaction survey covers five areas: planning, financial management, program management, schedule, and working relationships. Customers rate AEDC on a six point satisfaction scale. The survey has proven especially useful, as it tends to provide more actionable data than the indirect measures. (Hodgekiss Casipit 1994)

Naval Aviation Depot, Cherry Point (NADEP CP) is one of three surviving NADEPs. There were six NADEPs prior to the Base Realignment and Closure (BRAC)

process. The other two surviving depots are NADEP Jacksonville, Florida, and the subject of this thesis, NADEP NI. NADEP CP's mission is to "provide the nation with the highest quality, worldwide aviation depot level maintenance, engineering, and other logistics support on time and at the least cost." (Federal Quality Institute 1993) All of the NADEPs have a solid foundation in TQM as a result of the strong and early commitment of their parent organization, the Naval Air Systems Command. Like AEDC, NADEP CP's CSM program also employs both direct and indirect methods to ensure the depot's products are aligned with customer expectations. All NADEPs are required to maintain a Customer Liaison Program. (OPNAVINST 4790.2F) NADEP CP maintains a Customer Liaison Office, staffed with three full-time personnel; this is NADEP CP's single face to its customers. NADEP CP uses direct CSM methods such as monthly telephone surveys, annual face-to-face meetings with customers, and an independent survey conducted by Naval Air Systems Command. NADEP CP opted for telephone surveys instead of written surveys or customer feedback cards after they experienced common problems with written survey instruments: a low response rate, no assurance that the "right" people were completing the surveys, and indications that responses had more to do with customer attitudes than customer behavior. NADEP CP's indirect methods of measuring customer satisfaction include tracking a composite quality index, and cost and schedule performance.

C. WHAT NEEDS TO BE MEASURED?

"The first step in measuring customer satisfaction is obviously to assess the quality and performance of the service that you provide." (Urban & Wallace 1996) As an organization, you must be able to determine how your product or service is fulfilling the purpose for which it was intended. This should be done on an absolute basis and as a benchmark relative to the competition. While performance measurements are key to determining customer satisfaction, Urban, Wallace & Associates (consulting firm) firmly

believe there are three additional factors that provide a more accurate measure of customer satisfaction. These three factors are meeting/exceeding expectations, quality of the interaction, and problem resolution.

> Understanding customer expectations and then meeting or exceeding them is fundamental to creating satisfaction. Customers become satisfied only when a company meets or, better yet, exceeds their expectations. This is true regardless of the intrinsic quality of a company's product or service. Thus customer expectations are as important as company performance in determining customer satisfaction. It's important to recognize as well that expectations are not static. Performance which satisfies a customer today may not be sufficient to satisfy the same customer in tomorrow's competitive environment. As a result, companies need to track changes in customer expectations over time and continually adjust in order to meet those changing expectations. (Urban/Wallace 1996)

The quality of the interaction that a customer has with an organization is equally important to satisfying the customer. "Quite frequently, how a customer feels about the transaction (how he or she is being treated) is actually more important than the underlying quality of the product or service being purchased." (Urban/Wallace 1996) Customer satisfaction metrics should measure both relationship and transactional issues. An example of a relationship issue is the customer's intention of doing business with an organization again. A transactional issue would be one that deals with a particular interaction or exchange between a customer and an organization. A customer can be satisfied with the overall performance of an organization, yet dissatisfied with a particular transaction. If customer satisfaction measures are only set up to measure relationship issues, an organization might never discover dissatisfaction with particular types of transactions. This would be a missed opportunity for the organization to get data to improve its processes.

Another key area to be measured is customer complaints. This is one of the most fruitful areas to obtain actionable data to improve an organization's processes. Quality award winning firms all make it easy for the customer to complain. They understand that complaints are opportunities to exceed customer expectations and forge even stronger customer loyalty. (Gore 1996) Techniques used include 1-800 phone numbers, 24 hour service lines, customer response cards provided at the point of service, and customer service representatives who may travel to the customer's location to assist in resolving problems. (Gore 1996) "In many cases, we have found that good problem resolution actually increases customer satisfaction beyond the level which existed before the problem occurred." (Urban/Wallace 1996)

It is important to determine what factors influence customer satisfaction. Before customer satisfaction can be measured, the organization "needs to know the criteria used by the customers to evaluate the various products and services." (OMB93) There are many ways to do this. Some research advises "listen[ing] to customers and front-line employees to obtain their definitions of the agency's services and attributes that determine satisfaction [and] dissatisfaction." (OMB93) In the case of a NADEP, broad concerns shared by a variety of customers include turnaround time, cost, quality, and readiness of the delivered product. Metrics for these factors need to be developed that are accurate, simple, understood by the whole organization, provide actionable data, and that, ideally, can be shared with the customer.

Another set of customer satisfaction drivers relevant to NADEP NI are so-called "supplemental factors." A recent study, conducted by the Sloan Management Review (1994), found an important distinction that has developed in evaluating services is the difference between one's "core" product offering and one's "supplemental" (or sometimes, "value-added") services. Examples of core products are: safe transport from one city to

another via airplane, a physician's proper diagnosis and treatment, an attorney's sound legal advice, a hotel room with a comfortable bed and clean bath, the car to be purchased from an auto dealer, etc. Examples of supplemental products are: a movie and meal on board the airplane, the physician's friendly bedside manner, the trustworthiness of the attorney, bathroom amenities and minibars in the hotel room, and the car dealership's financing.

> In studies of customer satisfaction in service industries, managers are frequently surprised to find their customers are judging them "on the little things" (i.e., on the "supplemental"). There are good reasons for this phenomenon. First, customers assume the core offering will be of high quality -- it is a given. And while a poor "core" will result in customer dissatisfaction, a good "core" execution is not sufficient for customer satisfaction. A supporting reason is that, within and across competitors, there is typically little variability in the core product offerings -- planes usually do arrive safely, medical treatment is fairly accurate, hotel rooms usually do have decent bedding, etc. With so few differences among competitors on the core product (or within a competitor across different purchases), this information is not distinctive and therefore not useful to a customer forming an evaluation. Furthermore, most consumers find the core of some services hard to judge (e.g., most do not have the expertise to judge an attorney's contracts and suggestions). What varies more, and is easier to evaluate, are the supplemental. Interpersonal skills differ greatly from physician to physician and attorney to attorney, and hotel room and lobby accouterments also vary widely; all these things are easy to judge. Thus, in an evaluation of a service experience or in a choice between service providers, supplemental services provide greater information to consumers and become those features of the product offering that drive satisfaction and choice. (Iacobucci, Grayson, and Ostrom 1994)

This difficulty in judging the core product is particularly relevant to NADEP NI. Much of the work that NADEP performs on an aircraft is not readily apparent or visible to the customer. Customers may form much of their opinions of depot performance on more visible supplemental aspects such as the attitude of ferry flight crews or the appearance of the aircraft's cleanliness or paint job.

If specific performance criteria are spelled out in any service level agreements (SLAs), performance specifications, or contracts between the organization and a customer, these obviously must be measured, tracked, and reported to the customer. SLAs are a good way to shape customer expectations and develop closer relationships between organizations and their customers. (White96)

D. HOW IS CUSTOMER SATISFACTION MEASURED?

Customer satisfaction can be measured in many different ways. Many current top managers take that statement a step further and say that customer's satisfaction *must* be measured in different ways if you truly want to get an accurate picture of your customer satisfaction. Though firms often express a desire for a single, simple measure of customer satisfaction, the reality is that a variety of measures is generally required to capture the dynamics of customer satisfaction. A 1995 study conducted by the American Marketing Association surveyed 74 companies about their customer satisfaction programs. The research found that the predominant methodologies used to obtain customer satisfaction information are telephone and mail surveys (73% and 62%, respectively), followed by personal interviews (48%) and customer focus groups (47%). (Mentzer, Bienstock, and Kahn 1995) The survey also found the most popular types of analyses are cross tabulations, qualitative assessments, descriptive statistics (e.g., means, standard deviations, percentages), and regression analysis. "Measures can be classified into hard measures (e.g. financial data, production data,) perception (interviews, customer surveys), or a combination of the two, called Key Process Indicators." (Markowitz 96) Regardless, all metrics chosen by an organization must have a clearly defined purpose. Collecting customer satisfaction data which doesn't provide actionable data or isn't somehow used to make decisions or improve processes is a waste of time.

E. SURVEYS

The survey is not just the most common form of measuring customer satisfaction, it tends also to be the least expensive. However, a good survey is not easy to design and takes a great understanding of what is to be measured.

> Regardless of whether the people developing the survey are internal or external, make sure they understand the theoretical basis (e.g., gap, attitude, value-attribute, etc.) of the instruments and are familiar with standard procedures for developing and testing reliable, valid items. Keep in mind that customer satisfaction survey results that simply describe what was found provide no guidance for developing an action plan to improve satisfaction. (Mentzer, Bienstock, and Kahn 1995)

Although every organization has different requirements for conducting a customer satisfaction survey, there are some key areas that must be considered before any survey is conducted. The Office of Management and Budget (OMB) published a step-by-step guide for public sector organizations to mount a customer satisfaction survey. The guide focuses on the methodology of designing, conducting, and analyzing a survey. The following 12 steps are the methodology presented in the OMB guide:

1. Determining the scope of the survey measurement program
2. Identifying the factors and characteristics that underlie customer satisfaction
3. Identifying the target customer population for the survey
4. Developing a sampling frame of the target customers
5. Choosing a data collection method best suited to your customer survey
6. Choosing who will collect the survey data from customers
7. Developing and pretesting the survey questionnaire
8. Constructing the statistical design of the sample of customers
9. Designing procedures to achieve high response rates in the customer survey
10. Ensuring quality while the survey data are being collected
11. Processing the (returned) surveys and preparing them for analysis
12. Analyzing the data, summarizing the results, and presenting the findings (OMB 93)

Before beginning these steps there are certain basic planning questions that must be answered. "What are your agency's products/services?", "Who are the customers of

your agency?" and "What are the goals of your survey?" (OMB 93) These questions may sound simplistic, however they need to be answered prior to planning a customer satisfaction survey. Surveys must be constantly reviewed and updated if necessary. This seems to be a particular problem with managers. Dr. Sionade Robinson and Lyn Etherington of Cape Consulting in a recent interview stated the following observation:

> Management teams believe it is better to sacrifice the accuracy of customer satisfaction measurements, to their continuity. In other words, despite secretly fearing customer satisfaction surveys may no longer be tracking the right issues, they prefer to persist with out-of-date tools in order to "track our performance over time." This is particularly true in organizations who have linked components of their reward and recognition policies to customer satisfaction measurements. (Robinson & Etherington 1996)

There are some questions that the customer satisfaction survey must answer. If anything changes that would cause the survey to no longer answer these questions, then it must be revised. These questions are:

1. What levels of service do customers really expect from a supplier?
2. What attributes of the service are really important to retaining customers?
3. What levels of service do customers consider unacceptable?

A recent article by Mike Donovan, a management consultant, stated ten recommendations for measuring customer satisfaction that have proved to be noteworthy. The list is a good summarization of key points that an organization must keep in mind when measuring customer satisfaction.

1. Do not delegate customer satisfaction downward. Take an active role if you want to become the competitor that delights customers.

2. Recognize that quality is a given and that response time, delivery reliability, cost and value-added services will be required to gain a competitive advantage.

3. Understand all of the underlying issues that prevent your company from delivering topnotch customer satisfaction.

4. Resist the temptation to take a piecemeal approach to customer satisfaction improvement simply because the root causes of problems seem too complex and interconnected to allow an integrated solution.

5. Base customer satisfaction improvement on a strong executive directive and an action plan containing the principles and tactics that will guide the organization to positive and permanent change.

6. Survey customers to find out what they think your company's strengths and weaknesses are versus your competitors'. "Listen" and respond.

7. Focus the company's internal activities on quality and response time improvement.

8. Tie the measurement system for customer satisfaction improvement to the reward system for management and, if possible, all employees.

9. Conduct regular cross functional meetings to discuss what's working, what's not, and what actions need to be taken.

10. Develop a results-driven, tactically oriented action plan with the goal of providing the best customer satisfaction in your industry. (Donovan 1996)

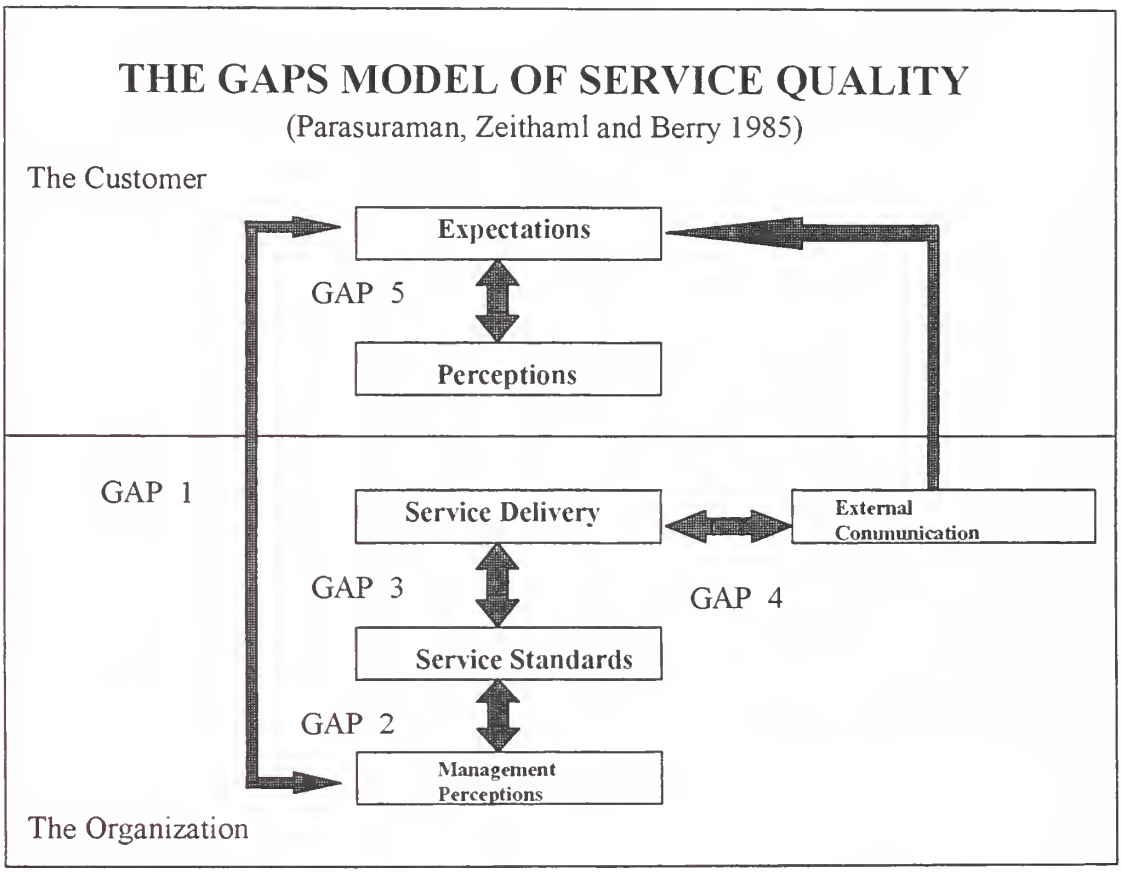
F. THE "GAPS" MODELS

"Overall satisfaction is affected by customer expectations, their ideal or required performance, and actual performance of the agency." (OMB93) A significant development influencing the study of service quality is the "gaps model" formulated by Parasuraman, Zeithaml, and Berry in 1985. While some experts may argue its degree of effectiveness, most all agree that it should be used to begin any customer satisfaction measurement program. This model is grounded in disconfirmation theory, which is also a prevalent approach to studying customer satisfaction.

> Disconfirmation theory as applied in service quality suggests that, before using a service, a client has certain expectations about it. After the service encounter, he compares those expectations with actual performance and his

> perception is either confirmed (if they match), negatively disconfirmed (if the perception is lower than the expectation), or positively disconfirmed (if the perception is higher than expectations). The essence of the theory is a comparison between expectations and performance. (Parasuraman 1994)

The gaps model focuses on several service gaps that affect service quality: between customers' and management's perception of service expectations (Gap 1); between management's perception of customers' expectations and service-quality specifications (Gap 2); between service-quality specifications and actual service delivery (Gap 3); and between actual service delivery and what is communicated to customers about it (Gap 4). The quality gap (Gap 5) can be closed by reducing the four internal gaps found within the management of a service organization. In measuring service quality and applying this model, however, the emphasis has been on the "expected service-perceived service gap" (Gap 5) (P-E) (Parasuraman 1994).



In 1988, to test the gaps model, Parasuraman, Zeithaml, and Berry devised the SERVQUAL instrument for measuring service quality. They revised it slightly in 1991. Since the gaps model was derived from studies in several different service industries, the authors intentionally designed a "generic instrument with good reliability and validity and broad applicability." (Parasuraman 1994) No other instrument for measuring service quality has been tested as stringently and comprehensively as SERVQUAL.

> In SERVQUAL, the client responds to the same 22 questions twice: first, to establish his expectations of the ideal service; then, to note his perceptions of the actual service provided by a particular firm. Each response is scored on a seven-point Likert scale. Difference scores are computed by subtracting the score for expectations from the perceptions, so scores can range from -6 to +6. The higher the score, the higher the perception of quality. (Parasuraman 1994)

The SERVQUAL mixed-model, proposed by Parasuraman, Zeithaml, and Berry (1994), adds a third survey that rates the importance of each attribute. The formula for measuring the service quality for each attribute is:

P = Perceived performance on the attribute (i.e., the amount of the attribute possessed by the object).

E = Expectancy norm.

I = Importance of attribute

SQ = Mixed-model perceived quality

(1) SQ = [(P - E) D[1] - (P - E) D[2] + ((I - E) - (P - I)) D[3]], where

D[1] = 1 if the attribute is a measurable attribute, or if the perceived performance is less than or equal to its importance(P </= I)(true in most cases); otherwise D[1] = 0.

D[2] = 1 if the attribute's expectancy norm is equal to its importance rating (E=I) and the perceived performance is greater than its importance (P > I); otherwise D[2] = 0.

D[3] = 1 If the attribute's expectancy norm is less than its importance rating and its perceived performance is greater than its importance (i.e., E < I and P > I); otherwise D[3] = 0. (Journal Of Marketing 1996)

The following is an example of a survey that would be used to obtain the P, E, and I factors. This example, from the Journal of Marketing, is for a banking institution:

Expectations

This survey deals with your opinions of services. Please show the extent to which you think institutions offering banking services should possess the features described in each statement. Do this by using the scale presented below. If you strongly agree that these institutions should possess a feature, place a seven on the line preceding the statement. If you strongly disagree that these institutions should possess a feature, place a one on the line. If your feelings are not strong, place one of the numbers between one and seven on the line to properly reflect the actual strength of your feelings. There are no right or wrong answers -- all we are interested

in is a number that best shows your expectations about institutions offering banking services.

	STRONGLY DISAGREE 1 2 3 4 5 6 7	STRONGLY AGREE
E1.	They should have up-to-date equipment & technology.	
E2.	Their physical facilities should be visually appealing.	
E3.	Their employees should be well dressed and appear neat.	
E4.	The appearance of the physical facilities of these nstitutions should be in keeping with the type of services provided.	
E5.	When these institutions promise to do something by a certain time, they should do so.	
E6.	When customers have problems, these institutions shouldbe sympathetic and reassuring.	
E7.	These institutions should be dependable.	
E8.	They should provide their services at the time they promise to do so.	
E9.	They should keep their records accurately.	
E10.	They shouldn't be expected to tell their customers exactly when services will be performed.	
E11.	It is not realistic for customers to expect prompt service from employees of these institutions.	
E12.	Their employees don't always have to be willing to help customers.	
E13.	It is okay if they are too busy to respond to customer requests promptly.	
E14.	Customer should be able to trust employees of these institutions.	
E15.	Customers should be able to feel safe in their transactions with these institutions' employees.	
E16.	Their employees should be polite.	
E17.	Their employees should get adequate support from these institutions to do their jobs well.	
E18.	These institutions should not be expected to give customers individual attention.	
E19.	Employees of these institutions cannot be expected to give customers personal attention.	
E20.	It is unrealistic to expect employees to know what the eeds of their customers are.	
E21.	It is unrealistic to expect these institutions to have their customers' best interests at heart.	

E22. They shouldn't be expected to have operating hours convenient to all their customers.

Performance

The following set of statements relate to your feelings about XYZ. For each statement, please show the extent to which you believe XYZ has the feature described by the statement. Once again, placing a seven on the line means you strongly agree that XYZ has that feature, and a one means you strongly disagree. You may use any of the numbers in the middle as well to show how strong your feelings are. There are no right or wrong answers -- all we are interested in is a number that best shows your perceptions about XYZ whether you use their service or not.

	STRONGLY DISAGREE	1 2 3 4 5 6 7 STRONGLY AGREE
P1.	XYZ has up-to-date equipment.	
P2.	XYZ 's physical facilities are visually appealing.	
P3.	XYZ 's employees are well dressed and appear neat.	
P4.	The appearance of the physical facilities of XYZ is in keeping with the type of service provided.	
P5.	When XYZ promises to do something by a certain time, it does so.	
P6.	When you have problems, XYZ is sympathetic and reassuring.	
P7.	XYZ is dependable.	
P8.	XYZ provides its services at the time it promises to do so.	
P9.	XYZ keeps its records accurately.	
P10.	XYZ does not tell its customers exactly when services will be performed.	
P11.	You do not receive prompt service from XYZ employees.	
P12.	Employees of XYZ are not always willing to help customers.	
P13.	Employees of XYZ are too busy to respond to customer requests promptly.	
P14.	You can trust employees of XYZ.	
P15.	You can feel safe in your transactions with XYZ's employees.	
P16.	Employees of XYZ are polite.	
P17.	Employees get adequate support from XYZ to do their jobs well.	
P18.	XYZ does not give you individual attention.	

P19. Employees of XYZ do not give you personal attention.
P20. Employees of XYZ do not know what your needs are.
P21. XYZ does not have your best interests at heart.
P22. XYZ does not have operating hours convenient to all their customers.

Importance

The following set of statements relate to your feelings about the importance of each feature described in your decision to purchase services. A seven means you consider the feature very important in deciding where to purchase banking services, a one means it is very unimportant. You may place any of the numbers shown on the scale below beside each feature to indicate its importance to you. There are no right or wrong answers -- all we are interested in is your perception of how important each feature is to you in your decision where to purchase banking services.

VERY UNIMPORTANT	1 2 3 4 5 6 7	VERY IMPORTANT

I1. Up-to-date equipment.
I2. Physical facilities that are visually appealing.
I3. Employees that are well dressed and appear neat.
I4. Physical facilities that appear to be in keeping with the type of service provided.
I5. When something is promised by a certain time, doing it.
I6. When there is a problem, being sympathetic and reassuring.
I7. Dependability.
I8. Providing service by the time promised.
I9. Accurate record keeping.
I10. Telling the customer exactly when the service will be performed.
I11. Receiving prompt service.
I12. Employees who are always willing to help customers.
I13. Employees who are not too busy to respond to customer request promptly.
I14. Employees who are trustworthy.
I15. The feeling that you are safe when conducting transactions with the firm's employees.
I16. Employees who are polite.
I17. Adequate support from the firm so employees can do their job well.
I18. Individual attention.
I19. Employees who give you personal attention.
I20. Employees who know what your needs are.

I21. A firm which has your best interests at heart.
I22. Convenient operating hours.

Other Measures

The following set of statements relate to your feelings about XYZ. Please respond by circling the number which best reflects your own perceptions.

(Future Purchase Behavior)
In the next year, my use of XYZ will be

NOT AT ALL 1 2 3 4 5 6 7 VERY FREQUENT

(Overall Quality)
The quality of XYZ's services is

VERY POOR 1 2 3 4 5 6 7 EXCELLENT

(Satisfaction)
My feelings towards XYZ's services can best be described as

VERY UNSATISFIED 1 2 3 4 5 6 7 VERY SATISFIED
(Journal Of Marketing 1996)

SERVQUAL is often used in conjunction with other questions which assess overall service quality or evidence of subsequent action, e.g. recommending the service to a friend, or willingness to use the service again.

Several criticisms have arisen about the SERVQUAL scale as a result of its widespread use and close scrutiny by other researchers. Most have been rebutted or addressed in subsequent articles by Parasuraman and his colleagues. The criticisms have focused on: the scale's theoretical base, the comparison norms for "expectations," the number and generic nature of the dimensions, the instrument's length, the ease of administration and analysis of data, the need to use both perceptions and expectations data, the validity of difference scores as data, and the basis for inferring that higher scores always indicate higher quality.

In numerous studies, researchers have reworded items, substituted or inserted new items, and removed items from the scale to make it more appropriate for the service industry being studied. Such modifications are not considered criticisms of SERVQUAL since modifications were anticipated and suggested by the original developers. As Parasuraman and his collaborators note, however, criticisms and findings questioning the number and nature of the dimensions may arise from modifying the scale so much that its integrity is undermined. Researchers have rarely disputed the validity of the individual items or statements used in the revised scale, considering them well-supported by the scale development and revision procedures and through use in subsequent studies. As a result, the actual SERVQUAL items serve as the basis for other instruments.

> Several of the criticisms of SERVQUAL can be remedied without rejecting the perception of service quality as a gap between performance and expectations or the P-E approach. Brown and others, for example, tested an alternative to difference scores. Addressing definitional problems with the term "expectations," Parasuraman and his cohorts have since clarified expectations as "normative," not prescriptive. The expectations represent the qualities an excellent service organization would have, not what it should have. Word changes in the 1991 revision establish that orientation more clearly. But other criticisms of SERVQUAL are interrelated and originate in its definition of service quality as a performance/expectations gap. Once this theoretical approach is accepted, and assuming the validity of the dimensions, the instrument must measure both expectations and performance through a range of items, resulting in a long instrument. Various researchers have discovered that performance scores alone have a greater predictive value for overall assessments of service quality and thus question the need for both measures. As a result, within the last few years, several authors have developed measures based on performance alone. (Journal Of Marketing 1996)

The movement to a performance-based measure is not strictly a pragmatic response to difficulties with the SERVQUAL instrument. Proponents of the performance-based methods contend that multi-attribute attitude theory, especially the "adequacy-importance" model, is more appropriate than the gaps model and disconfirmation theory if the intent is to predict actual behavior or behavioral intent. The basic premise of multi-

attribute attitude theory is that clients form attitudes about service or product quality on the basis of service or product attributes. The argument for this theory is that it better explains relationships between service quality, customer satisfaction, and purchase or use intentions.

SERVPERF is another model used to generate a performance-based measure of service quality. It was developed by Cronin in 1992 in a study of four service sectors (banking, pest-control, dry cleaning, and fast food). Operationally, SERVPERF in its final form omits the expectation items section of SERVQUAL. SERVPERF consists of the 22 items questioning customers' perceptions of service, worded exactly as in SERVQUAL. It may include questions to assess the importance of the items' dimensions and several questions about overall service quality, satisfaction, and purchase intention. As in SERVQUAL, the questions can be modified and additional items included. SERVPERF is shorter and does not require the use of difference scores for analysis. (Journal Of Marketing 1994)

After reviewing the different "gaps" models and the published criticisms of them, we adapted the SERQUAL mixed model of service quality as a starting point to develop a set of tailored customer satisfaction measures for NADEP NI's F/A-18 maintenance program. The SERVQUAL-type instrument we developed is presented in Chapter IV. It enabled us to determine where differences exist between customer expectations and performance perceptions, and to rank the relative importance to the customer of those differences. From this data, metrics and systems were developed for the depot to use to measure the satisfaction of each of its four different types of customers.

G. IMPLEMENTING A CUSTOMER SATISFACTION PROGRAM

The Customer Satisfaction Program must be unique to the organization if it is going to be successful. Success depends greatly on meeting the different needs of all the organization's stakeholders. However, there are some fundamental steps in implementing

a Customer Satisfaction Program that are basic to all programs. These steps were well defined in a recent article in the American Marketing Association's *Marketing Management* periodical. The eight step process is as follows:

1. Institute a process to tap management, employees, outside consultants, and industry sources for input on dimensions critical to customer satisfaction.

2. Use this feedback to develop an ongoing program of customer focus groups and personal interviews to identify critical customer satisfaction dimensions.

3. Work with a professional staff to develop telephone and/or mail survey instruments that reliably and validly incorporate the identified dimensions.

4. Ensure employees understand the theoretical basis of the instruments and are familiar with standard procedures for developing and testing reliable, valid items.

5. Conduct the surveys and reevaluate their reliability and validity.

6. From these data, develop a customer satisfaction metric that not only relates the level of satisfaction of your customers, but also analyzes the importance of the various dimensions of that satisfaction.

7. Use the dimensional information to develop an action plan for improving each dimension and communicating these improvements to customers. (Delivery of customer satisfaction is not a reality if the customer does not notice it.)

8. Tie the performance evaluation and compensation of each mployee involved in the action plan to its accomplishment. (Mentzer, Bienstock, and Kahn 1995)

The cost of implementing a customer satisfaction program will vary from organization to organization. The periodic review of customer satisfaction measures should include a cost/benefit analysis of the different measures (measure only things worth

measuring). However, an organization must consider the cost of not having the data obtained from different measures, when conducting a cost/benefit analysis.

H. CUSTOMER SATISFACTION PITFALLS

A recent article by Iacobucci, Grayson, and Ostrom pointed out many misconceptions about customer satisfaction. They admit that service quality and customer satisfaction are important to service organizations because a customer's evaluation of a purchase determines the likelihood of repurchase and, ultimately, the bottom-line of business success. However, they bring to light the dangers of over-simplifying the concept of customer satisfaction.

> Simple ideas are often those that 'catch on' fastest, and, true to form, the gap concept is popular in industry and academia. Books on customer service invariably feature examples of service providers who made extra efforts to please their customers. Furthermore, it is currently in vogue for managers in many industries to make statements such as, 'We don't want to just meet our customers' expectations, we want to exceed them,' or 'We don't want to simply satisfy our customers (by meeting expectations), we want to 'delight' them (or 'amaze' them) by exceeding their expectations.' Despite the persuasiveness of mangers striving to 'exceed their customers' expectations,' this point of view has its limitations. The strength of the concept -- its simplicity -- is simultaneously its weakness; it is too simple to provide a thorough understanding of customer evaluations. We recognize that these ideas have taken the industry by storm and, indeed, seem so well accepted that they are beyond questioning. However, we feel compelled to discuss the shortcomings in order to put a brake on the current unquestioned use of the 'exceeding expectations' ideology. (Iacobucci, Grayson, and Ostrom 1994)

According to Iacobucci, Grayson, and Ostrom discovering what customers want and then delivering it is simply good marketing. Attention to customers is what distinguishes marketers from engineers and operations personnel, etc. "We are not saying that a focus on customer satisfaction is not necessary or is a bad thing. Indeed, that would be like saying marketing is not necessary or is bad. If it takes a new buzzword to refresh an attention to the consumer, so be it." (Iacobucci, Grayson, and Ostrom 1994) The goal

of the satisfied customer, like good marketing, must permeate the entire service delivery process, from planning through execution. If customer satisfaction data is used only for post-purchase assessment, then it is no more advanced than a sales force counting its receipts. It is what you do with your customer satisfaction data that is important.

> Knowing how you stand in your customers' eyes is interesting, but it is only valuable if the information is used to improve performance. This is the point at which some customer satisfaction programs break down. If you tell customers that you are interested in their satisfaction and input, they expect you to act on that information. If you are not prepared to follow through, the whole process can backfire. (Zabusky 1995)

A recent study by Cape Consulting found several problems with the manner in which some organizations are using customer satisfaction data. "Many employees find themselves enduring a gruesome 'death by a thousand graphs' of aggregated customer satisfaction measures on service attributes over which they feel themselves to have little or no influence." (Robinson & Etherington 1996)) The problem with most organizations seems to be that the front-line service provider perceives aspects of quantitative feedback to be removed from the real service issues that they understand.

Another issue is trying to understand the formats in which customer satisfaction survey results are presented. What does scoring a 5.6 on cooperativeness mean? Is it good or bad? Without clear explanations or goals, many customer satisfaction measurements end up being just meaningless information presented at staff meetings. Effective customer satisfaction measures give a clear understanding of the organization's present position in a given attribute. The attributes and their relationship to the organization's goals must, in turn, be understood well enough so that strategies for improvement can be developed.

Some managers are running around proclaiming "The Customer Is King" and sketching organizational charts with customers positioned where CEOs used to sit. While achieving customer satisfaction is an admirable goal, an organization must answer to

multiple sets of "customers" (e.g., consumers, boards, shareholders), or in the case of NADEP NI, squadrons, wings, type commands and NAVAIR, whose goals may be in conflict. For example, while a squadron may wish for an aircraft to be completely repainted as part of the depot process, NAVAIR may not consider this financially feasible or desirable from an engineering standpoint. Likewise, the squadron may expect the airplane to return from the depot in a Full Mission Capable (FMC) status, while the type command may be more concerned with the additional turnaround time required to achieve FMC status. In these cases, the expectations of all customers must be examined. So before attempting to satisfy all customers, an organization must identify all customers' expectations and rank them according to importance in achieving the organization's mission.

Iacobucci, Grayson, and Ostrom claim the phrase, "The Customer Is Always Right," is utter nonsense. They point out studies of product liability that consistently attribute at least half of product failures to consumer misuse. In addition, the briefest inquiry of any sales force will confirm that some customers are uninformed, unrealistic, and demanding. Most businesses have certain segments of customers who are not profitably worth satisfying. This raises the question about customer education. In private industry, competition drives consumers to seek out the best service provider. However, in the case of a government agency or sole source provider, the customer has little or no incentive to understand the capabilities and constraints of a service provider. This lays some burden on the organization to educate the customer, in order for them to have realistic expectations of service.

> Customers evaluate purchases as an aggregate function of a number of factors. Value, or the tradeoff between the quality of the item and its costs, is a primary consideration. In essence, this judgment is one of equity -- how do the outcomes rate (e.g., the quality of what I receive) relative to the inputs (e.g., the price I paid or efforts and costs I incurred). Notice too that a simple derivation of the desire to "exceed expectations" would be to sell products at costs low enough to be unprofitable to businesses,

e.g., giving away a Mercedes would no doubt satisfy (and even "delight") a customer. While many businesses are seeking high levels of customer satisfaction, none would do so rationally if it meant jeopardizing their long-term existence. The "exceed expectations" perspective would be more thoughtful and useful if such constraints were also explicitly considered. (Iacobucci, Grayson, and Ostrom 1994)

I. CONCLUSION

Our literature review provided us with the thorough understanding of customer satisfaction necessary to develop a measurement system for NADEP NI. The following is a list of the issues most relevant to producing a tailored set of customer satisfaction measures for NADEP NI:

1) Identify all external customers and consider their unique requirements.
2) Government agencies must "educate their customers" to ensure their customers have appropriate expectations..
3) The "gaps model" can be an effective tool if properly fitted to the organization.
4) Measures must be linked to processes, and give actionable data
5) The "right things" should be measured, and resources should not be wasted gathering measurement data that will not be acted on.
6) A variety of measures is needed, direct and indirect, to truly understand the satisfaction level of an organization's customers.
7) It is critical that customer satisfaction measurement data be integrated into an organization's decision making processes.
8) Customer satisfaction measurements need to be periodically reevaluated to ensure that the organization is still measuring the right things.

IV. PRETEST QUESTIONNAIRE DEVELOPMENT

A. INTRODUCTION

In order to develop a customer satisfaction measurement system that is truly useful to NADEP NI, we had to understand NADEP NI's customer's expectations and their attitudes about performance and the importance of different attributes of F/A-18 depot maintenance. We developed a pretest questionnaire which was sent to several of NADEP NI's customers. This pretest questionnaire was adapted from the SERVQUAL mixed model (Parasuraman, Zeithaml, and Berry 1994) and modified according to our data needs. The information obtained in responses to this pretest questionnaire is paramount in developing our tailored customer satisfaction measurement system for NADEP NI.

B. BACKGROUND

The background information used to develop this pretest questionnaire was obtained through interviews with squadron maintenance officers, squadron commanders, wing maintenance officers, type command class desk and depot coordinator personnel, and NAVAIR Code 6.0 personnel. These interviews, were conducted both telephonically and in person. During these interviews we tried to determine each customer's opinions about F/A-18 depot maintenance. We tried to keep the interviews as open ended as possible, allowing the customers to express all possible concerns.

C. MODEL IDENTIFICATION

We decided to adapt the SERVQUAL mixed model (Parasuraman, Zeithaml, and Berry 1994) because we felt that it best represented the type of analysis required to develop a customer satisfaction measurement system for NADEP NI. This model has been used by many companies to accurately measure customer satisfaction. These well docuemented results were the basis of our decision to use SERVQUAL. We felt that

understanding the gaps between importance, expectations and performance of the different attributes would focus our research in developing a customer satisfaction measurement system. This model also captures differences in customer type and customer location, when responses are sorted by these criteria.

D. ATTRIBUTE IDENTIFICATION

The four attributes that we measured are quality, turnaround time, cost and customer relations with the depot. These attributes were suggested by our interviews with customers, NADEP NI's current customer satisfaction measurement system, and our literature review, including NAVAIR Instruction 13023.1 (*Naval Aviation Depot Workload and Material Standards Required for the Aircraft and Engine Programs*). From our interviews, it was clear that different customers considered different attributes more important. Our pretest questionnaire was designed to clearly make these distinctions.

The attribute of quality, for the purpose of the pretest questionnaire, deals directly with the finished product, delivered aircraft in this case. We developed quality related questions to cover the areas that have the greatest impact on NADEP NI's F/A-18 customers. The questions on turnaround time were developed to capture customers' scheduling concerns as well as the operational impact of F/A-18 depot maintenance. The cost questions assess each customer's knowledge and concern about the cost associated with NADEP NI's F/A-18 maintenance program. The relationship questions were developed to assess the "value added" attributes of NADEP NI's F/A-18 program. While these attributes are usually the easiest to improve, our literature review indicated that they often have the greatest impact on customer satisfaction.

E. QUESTIONNAIRE FORMAT

In our literature review, we found that personal interviews, telephone interviews and self-administered questionnaires (mail surveys) are the most common methods of collecting data. Figure 4-1 lists the advantages and disadvantages of each method. Due to the cost and time constraints, we chose to use a self-administered questionnaire as our prime data collection method.

A copy of the pretest questionnaire is enclosed at the end of this chapter. The questionnaire is divided into three sections. The first section deals with the customers' general expectations concerning F/A-18 depot maintenance. The second section evaluates the customers' perceptions of NADEP NI's F/A-18 maintenance program performance. The final section gathers customers' assessments about the importance of the different aspects of F/A-18 depot maintenance. Each section of the pretest questionnaire is divided into 5 parts. The first four parts contain 23 statements that pertain to the attributes of quality, turnaround time, cost and depot relations. The fifth part, called "other," deals with specific concerns that we encountered during our research. At the end of each section, there is space for the respondent to make additional comments about the section or the questionnaire in general.

The questionnaire was developed with the understanding that all respondents will be middle and upper level maintenance managers with a least some working experience at NADEP NI. In developing the pretest questionnaire, we felt it important to make the questionnaire as easy as possible to fill out and return. We therefore used the following criteria in developing our pretest questionnaire:

1. *Personal interviews:*

Advantages:

* Use a more representative sample.
* Achieve higher return rate.
* Produce fewer incomplete questionnaires.
* More questions can be asked.
* More complex measurement methods can be used.
* Responses may be more readily verfied.

Disadvantages:

* More costly
* Subject to interviewer bias, error and cheating.
* Subject to response bias.

2. *Telephone interviews:*

Advantages:

* Can be conducted quickly
* Relatively low cost.

Disadvantages:

* Sample bias.
* Usually must be brief.

3. *Self-Administered questionnaires:*

Advantages:

* Least costly.
* Avoid interview bias.
* Larger number of respondents can be reached.
* More convenient to the respondent.
* Requires a smaller staff for administering.

Disadvantages:

* Sample is almost certainly not likely to be "representative" without follow up.
* Must be carefully designed and pretested to avoid respondent confusion.

Figure 4-1 Data Collection Methods (Advantages and Disadvantages) (Morris and Birdwell 1988)

1) Clear and concise instructions.

2) Understandable and unambiguous measurement scales.

3) Easy to answer, closed-ended questions.

4) A section to provide additional comments about customer satisfaction and the questionnaire.

5) Minimize the number of questions and time required to complete the questionnaire, while still providing the necessary data.

6) Professional appearance.

7) A self addressed stamped envelope provided with each questionnaire.

F. MEASUREMENT INSTRUMENT

There are a multitude of different measuring instruments to collect data. During our literature review, the most common marketing measurements were the semantic differential scale, Likert scales and paired comparisons. Figure 4-2 shows examples of these measuring instruments.

We decided to use a version of the Likert scale. This instrument provides data in the most relevant form. Also, the SERVQUAL model, from which we adapted our pretest questionnaire, uses the Likert scale. We decided to use a range of only five choices, instead of the usual seven on a Likert scale, due to the limited population and small number of questionnaires administered. For the "Expectations" and "Performance" sections of the pretest questionnaire, our version of the Likert scale used the following definitions:

5=Agree Strongly

4=Agree

3=Undecided

2=Disagree

1=Disagree Strongly

The "Importance" section of the pretest questionnaire used the following Likert scale:

5=Very Important

4=Important

3=Undecided

2=Unimportant

1=Very Unimportant

We strongly felt that the customers would be able to clearly express their opinions using this modified scale.

MEASUREMENT INSTRUMENTS

SEMANTIC DIFFERENTIAL SCALE

"Would you rate General Motors as being:

Progressive ____ ____ ____ ____ ____ ____ ____ Conservative
1 2 3 4 5 6 7

Strong ____ ____ ____ ____ ____ ____ ____ Weak?"
1 2 3 4 5 6 7

LIKERT SCALE

"Ajax is an excellent cleanser."

____ Agree extremely strongly
____ Agree fairly strongly
____ Agree
____ Undecided
____ Disagree
____ Disagree fairly strongly
____ Disagree extremely strongly

PAIRED COMPARISONS

Do you prefer Brand A or Brand B?
Do you prefer Brand C or Brand A?

Do you prefer Brand B or Brand C?

Figure 4-2 Commonly Used Types of Rating Methods and Scales (Morris & Birdwell 1988)

G. PROCEDURE

The step by step procedure used to administer our pretest questionnaire is as follows:

1. Gained approval from NADEP NI to administer the pretest questionnaire.

2. Received from NADEP NI a list of all squadrons that had received an F/A-18 aircraft back from NADEP NI (either from MCAPP or major ISR work) in the last 18 months.

3. Contacted east and west coast USN and USMC F/A-18 wing maintenance officers to arrange their assistance in distributing the pretest questionnaire to all concerned squadrons.

4. Contacted NAVAIR and the type command staffs to alert them the pretest questionnaire was enroute.

5. Mailed all pretest questionnaires with self addressed stamped envelopes. Squadron questionnaires were sent via their wing maintenance officers, where possible, for distribution.

6. Called customers approximately one week later to ensure they had received the pretest questionnaire.

H. CONCLUSION

The information gathered while developing this pretest questionnaire and analyzing the resulting data forms the basis for identifying a tailored set of customer satisfaction measures for NADEP NI. This pretest questionnaire seems to have captured the most important factors of customer satisfaction for the NADEP NI customer. Analyzing the gaps in expectations, performance and importance, can focus NADEP NI's efforts in improving customer satisfaction.

NADEP NORTH ISLAND F/A-18 PROGRAM
CUSTOMER SATISFACTION PRETEST QUESTIONNAIRE

Dear NADEP North Island Customer,

We are students at the Naval Postgraduate School in the Systems Management Department currently developing a set of customer satisfaction measures for Naval Aviation Depot North Island (NI). This work is being done, at the request of NADEP NI, for our thesis requirement. NADEP NI is genuinely concerned with providing its customers with the best service possible. In order to accomplish this, NADEP NI must have a thorough understanding of the perceptions, expectations and importance factors that each of its customers have towards the services that it provides.

This questionnaire meets the "pretest" criteria of draft OPNAV Instruction 5300.8B. It will assist us in the development of data collection instruments that will ensure NADEP NI can properly measure its customers' satisfaction levels. This questionnaire was developed based on comments from NADEP NI customers whom we interviewed. Please assist us in developing these important measurement instruments by completing the enclosed questionnaire. Feel free to write any comments concerning specific questionnaire items any place on the form. At the end of each section, there is an area for you to write comments or suggestions that you think would improve customer satisfaction.

Please return the completed survey in the accompanying self-addressed stamped envelope provided, or mail to:

CDR Brian Forsyth, USN
Naval Postgraduate School, SGC# 2357
Monterey, CA 93943

We, as well as NADEP NI, greatly appreciate the time and effort you spend in completing this questionnaire. We believe that this work spent to develop a customer satisfaction measurement system will lead to your improved satisfaction as a NADEP NI customer. Thank you for your interest and cooperation.

Brian A. Forsyth, CDR, USN

John P. Chadbourne, CPT, USA

NADEP NORTH ISLAND F/A-18 PROGRAM
CUSTOMER SATISFACTION PRETEST QUESTIONNAIRE

Please fill in: your activity's name _____
your billet title _____

PART ONE: EXPECTATIONS

This portion of the survey deals with your opinions of F/A-18 aircraft depot maintenance services in general, whether performed at NADEP North Island or anywhere else. Please show the extent to which you think depots offering F/A-18 aircraft maintenance services should possess the characteristics described in each statement. Do this by using the scale presented below. If you strongly agree that depots should possess that characteristic, circle the number five on the same line. If you strongly disagree that they should possess that characteristic, circle the number one on the same line. If your feelings are not strong, circle the number between one and five that best reflects the strength of your feelings. There are no right or wrong answers -- all we are interested in is a number that best shows your expectations about depots offering F/A-18 aircraft maintenance services.

1=Disagree Strongly 2=Disagree 3=Undecided 4=Agree 5=Agree Strongly

QUALITY

Aircraft delivered to squadrons after MCAPP should be FMC	1	2	3	4	5
Aircraft delivered from depot should be free of quality defects	1	2	3	4	5
Aircraft delivered from MCAPP should have a "good" paint job	1	2	3	4	5
Aircraft logbooks and records delivered from depot should be discrepancy free	1	2	3	4	5
Aircraft delivered from depot should be clean	1	2	3	4	5
Aircraft delivered from depot should be FOD-free	1	2	3	4	5
PACE inspection criteria should be consistent	1	2	3	4	5
All modification or special rework items requested by the squadron should be accomplished during MCAPP	1	2	3	4	5

TURNAROUND TIME

Depot maintenance should not impact operational requirements	1	2	3	4	5
Aircraft should complete depot maintenance on schedule	1	2	3	4	5
Customers should be notified immediately of changes to scheduled completion dates	1	2	3	4	5

COST

My activity should be concerned about aircraft depot maintenance costs	1	2	3	4	5
Aircraft MCAPP cost should be related to actual depot man-hours expended	1	2	3	4	5

RELATIONSHIP

My depot point-of-contact should be easy to get a hold of	1	2	3	4	5
The OPNAV, NAVAIR and local procedures for doing business with the depot should be designed for easy interaction with the depot	1	2	3	4	5
The depot should respond in a timely manner to requests for services	1	2	3	4	5
The depot should respond in a timely manner to customer complaints	1	2	3	4	5
The depot should inform customers about the specific work performed on their aircraft as part of MCAPP	1	2	3	4	5
Aircraft schedule status information should be easy to obtain	1	2	3	4	5
The depot should visit customers periodically to assess their needs	1	2	3	4	5
The depot should provide a point of contact to facilitate customer complaints/requests	1	2	3	4	5
Depot employees should deal with customers in a courteous and helpful manner	1	2	3	4	5
Depots are expected to give customers individual attention	1	2	3	4	5

OTHER

Circle the item that you feel best describes your expectations

Aircraft should be returned from MCAPP in less than:

120 days 100 days 80 days 50 days

Aircraft MCAPP cost should be less than:

$700K $500K $300K $100K

In the space provided below, please make any additional comments pertaining to your expectations of depot services.

PART TWO: PERFORMANCE

This portion of the survey deals with your feelings of NADEP North Island's performance as an offeror of F/A-18 depot level maintenance. Please show the extent to which you believe NADEP NI's F/A-18 maintenance program has the characteristics described in each statement. Do this by using the scale presented below. If you strongly agree that NADEP NI's F/A-18 maintenance program possess that characteristic, circle the number five on the same line. If you strongly disagree that NADEP NI's F/A-18 maintenance program possess that characteristic, circle the number one on the same line. If your feelings are not strong, circle the number between one and five that best reflects your feelings. There are no right or wrong answers -- all we are interested in is a number that best shows your perception about NADEP NI's F/A-18 maintenance program performance.

1= Disagree Strongly 2=Disagree 3=Undecided 4=Agree 5=Agree Strongly

QUALITY

Aircraft delivered to squadrons after MCAPP are FMC	1	2	3	4	5
Aircraft delivered from depot are free of quality defects	1	2	3	4	5
Aircraft delivered from MCAPP have a "good" paint job	1	2	3	4	5
Aircraft logbooks and records delivered from depot are discrepancy free	1	2	3	4	5
Aircraft delivered from depot are clean	1	2	3	4	5
Aircraft delivered from depot are FOD-free	1	2	3	4	5
PACE inspection criteria are consistent	1	2	3	4	5
All modification or special rework requested by the squadron is accomplished during MCAPP	1	2	3	4	5

TURNAROUND TIME

Depot maintenance does not impact operational requirements	1	2	3	4	5
Aircraft complete depot maintenance on schedule	1	2	3	4	5
Customers are notified immediately of changes to scheduled completion dates	1	2	3	4	5

COST

My activity is concerned about aircraft depot maintenance costs	1	2	3	4	5
Aircraft MCAPP costs accurately reflect actual depot man-hours expended	1	2	3	4	5

RELATIONSHIP

My depot point-of-contact is easy to get a hold of	1	2	3	4	5
The OPNAV, NAVAIR and local procedures for doing business with the depot are designed for easy interaction with the depot	1	2	3	4	5
The depot responds in a timely manner to requests for services	1	2	3	4	5
The depot responds in a timely manner to customer complaints	1	2	3	4	5
The depot informs customers of the specific work performed on their aircraft as part of MCAPP	1	2	3	4	5
Aircraft schedule status information is easy to obtain	1	2	3	4	5
The depot visits customers often enough to assess their needs	1	2	3	4	5
The depot has given me a point of contact to facilitate customer complaints/requests	1	2	3	4	5
Depot employees deal with customers in a courteous and helpful manner	1	2	3	4	5
The depot gives customers individual attention	1	2	3	4	5

OTHER

Circle the item that you feel best describes NADEP NI's performance:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Very Poor Poor Fair Good Excellent

My feelings towards NADEP NI's services can be best described as:

Very Unsatisfied Unsatisfied Neutral Satisfied Very Satisfied

In the space provided below, please make any additional comments pertaining to your feelings of NADEP NI's performance of depot services.

PART THREE: IMPORTANCE

This portion of the survey deals with your assessment about the importance of different service characteristics of depot maintenance. A five means you consider the characteristic very important for depots performing F/A-18 aircraft maintenance services, a one means it is very unimportant. You should circle the number between one and five that best reflects your assessment of the importance of that characteristic. There are no right or wrong answers -- all we are interested in is a number that best shows how important each characteristic is to you in your use of F/A-18 aircraft depot maintenance services.

1= Very Unimportant 2=Unimportant 3=Undecided 4=Important 5=Very Important

QUALITY

Aircraft being returned to squadron FMC after MCAPP	1	2	3	4	5
Aircraft being delivered from depot being free of quality defects	1	2	3	4	5
Aircraft being delivered from MCAPP with "good" paint job	1	2	3	4	5
Aircraft logbooks and records being delivered from depot discrepancy free	1	2	3	4	5
Aircraft being delivered from depot clean	1	2	3	4	5
Aircraft being delivered from depot FOD-free	1	2	3	4	5
PACE inspection criteria being consistent	1	2	3	4	5
Modification or special rework items requested by the squadron being accomplished during MCAPP	1	2	3	4	5

TURNAROUND TIME

Depot maintenance not impacting operational requirements	1	2	3	4	5
Aircraft depot maintenance being completed on schedule	1	2	3	4	5
Customers being notified immediately of changes to scheduled completion dates	1	2	3	4	5

COST

My activity being concerned about aircraft depot maintenance costs	1	2	3	4	5
Aircraft MCAPP cost being related to actual depot man-hours expended	1	2	3	4	5

RELATIONSHIP

Depot point-of-contact being easy to get a hold of	1	2	3	4	5
The OPNAV, NAVAIR and local procedures for doing business with the depot being designed for easy interaction with the depot	1	2	3	4	5
The depot's response time to requests for services	1	2	3	4	5
The depot's response time to customer complaints	1	2	3	4	5
The depot informing customers of the specific work being performed on their aircraft as part of MCAPP	1	2	3	4	5
Aircraft schedule status information being easy to obtain	1	2	3	4	5
The depot visiting customers periodically to assess their needs	1	2	3	4	5
The depot providing a point of contact to facilitate customer complaints/requests	1	2	3	4	5
Depot employees dealing with customers in a courteous and helpful manner	1	2	3	4	5
Depots giving customers individual attention	1	2	3	4	5

OTHER

Please rank in order of importance (1 being most important, etc) the following considerations as they relate to depot maintenance of F/A-18 aircraft:

_____ COST

_____ QUALITY

_____ TURNAROUND TIME

_____ OTHER (please specify) _____

My need to understand the depot's capabilities and constraints is:

Very Unimportant Unimportant Undecided Important Very Important

In the space provided below, please make any additional comments about what you feel is important about depot maintenance of naval aircraft.

_____

_____

_____

_____

V. CUSTOMER PRETEST QUESTIONNAIRE RESULTS

A. INTRODUCTION

In this chapter, we analyze the results from the NADEP NI customer pretest questionnaire. This analysis shows the areas on which NADEP NI must focus to improve customer satisfaction. Analysis was conducted by customer type (squadron, wing, TYCOM, and systems command), by geographic location (east vs. west coast) and by service (Navy vs. Marine). The analysis identifies the gaps between expectations and performance perceptions of the different NADEP NI F/A-18 customers. It then identifies the importance that customers place on each attribute. While this analysis is tailored for NADEP NI, the systematic approach can be used by all service depots and other government agencies as well.

B. QUESTIONNAIRE KEY

To assist in presenting our data, we developed a simple set of alpha-numeric designators to identify the different questions on the pretest questionnaire. The designators consisted of two letters and a number. The first letter designates if it is a question from the expectations, performance or importance sections of the questionnaire, using the letters E, P or I, respectively. The next letter identifies the question as a quality, turnaround, cost or relations attribute, using the letters Q, T, C or R, respectively. Finally the number identifies the order it appears within each attribute. For example the alpha-numeric designator EQ4 identifies the fourth question under the attribute quality in the expectations section of the pretest questionnaire. Figure 5.1 is a key that shows the question number and attribute of the pretest questionnaire in generic form. Placing an E, P or I in front of the designator would give the section of the questionnaire being analyzed.

PRETEST QUESTIONNAIRE DESIGNATOR KEY

Q1	Aircraft delivered to squadrons after MCAPP should be FMC
Q2	Aircraft delivered from depot should be free of quality defects
Q3	Aircraft delivered from MCAPP should have a "good" paint job
Q4	Aircraft logbooks and records delivered from depot should be discrepancy free
Q5	Aircraft delivered from depot should be clean
Q6	Aircraft delivered from depot should be FOD-free
Q7	PACE inspection criteria should be consistent
Q8	All modification or special rework items requested by the squadron should be accomplished during MCAPP
T1	Depot maintenance should not impact operational requirements
T2	Aircraft should complete depot maintenance on schedule
T3	Customers should be notified immediately of changes to scheduled completion dates
C1	My activity should be concerned about aircraft depot maintenance costs
C2	Aircraft MCAPP cost should be related to actual depot man-hours expended
R1	My depot point-of-contact should be easy to get a hold of
R2	The OPNAV, NAVAIR and local procedures for doing business with the depot should be designed for easy interaction with the depot
R3	The depot should respond in a timely manner to requests for services
R4	The depot should respond in a timely manner to customer complaints
R5	The depot should inform customers about the specific work performed on their aircraft as part of MCAPP
R6	Aircraft schedule status information should be easy to obtain
R7	The depot should visit customers periodically to assess their needs
R8	The depot should provide a point of contact to facilitate customer complaints/requests
R9	Depot employees should deal with customers in a courteous and helpful manner
R10	Depots are expected to give customers individual attention

Figure 5.1

C. KEY TERMS AND ACRONYMS

The following is a list of key terms and acronyms and their meanings as they pertain to this analysis:

Mean	The arithmetic average of the data values. (Creyer & Miller 1995)
Median	The middle value for a data set ordered in magnitude. (Creyer & Miller 1995)
Mode	Most frequently used response in data set. (Creyer & Miller 1995)
Standard Deviation	A measure of variability obtained as the square root of the number obtained from the sum of squared deviations of the observations from their mean divided by n-1. (Creyer & Miller 1995)
Variance	The square of the standard deviation. (Creyer & Miller 1995)
Expectations	The act of anticipating an occurrence with reason or justification. (Random House 1992)
Importance	The quality of having much significance or consequence. (Random House 1992)
Performance	The act of executing an act in the established manner. (Random House 1992)
Perceptions	The act of apprehending by means of the senses or of the mind. (Random House 1992)
P-E Gap	The difference between the value assigned for expectations and the value assigned for performance perceptions of a customer or group of customers. (Parasuraman, Zeithamal and Berry 1985)

D. VALUE ASSIGNMENT

Values assigned to each question were designated by compiling all responses from customers in a group and calculating the median, mode, mean, variance and standard deviation of the responses. If the median and mode were the same value, this number was used. If they were different, whichever value was closer to the mean was used. The

variance and standard deviation are given to show the degree of diversity of responses from the customers. Although we sent questionnaires to 100 percent of all NADEP customers who had interacted with NADEP NI's F/A-18 maintenance program in the last 18 months, only 50 pretest questionnaires were distributed. The statistical measures used in this analysis assist in formulating a customer satisfaction measurement system for NADEP NI to measure customer satisfaction. Therefore, due to the small sample size, we are not claiming these measures to be of statistical significance.

E. CUSTOMER TYPE ANALYSIS

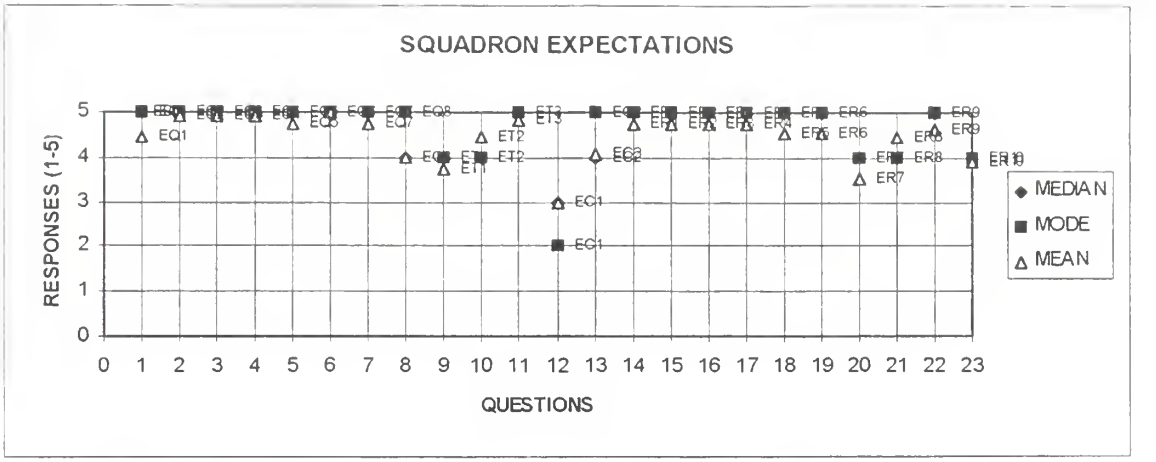
The first analysis was conducted by customer type. This analysis shows the P-E gap and importance factors of each customer type and compares it with other customer types. We began by analyzing squadron responses.

1. Squadron Analysis

Of pretest questionnaires that were sent to squadrons, a total of 65% percent of squadrons responded. The following chart and graph show the expectation responses received from Squadrons:

SQUADRON EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	5	5	5	5	5	5	5	4	4	4	5	3	4	5	5	5	5	5	5	4	4	5	4
MODE	5	5	5	5	5	5	5	5	4	4	5	2	5	5	5	5	5	5	5	4	4	5	4
MEAN	4.5	4.9	4.9	4.9	4.7	5	4.7	4	3.7	4.5	4.8	3	4.1	4.7	4.7	4.7	4.7	4.5	4.5	3.5	4.5	4.6	3.9
VARIANCE	1.5	0.1	0.1	0.1	0.2	0	0.4	1.4	1	0.3	0.2	1.8	0.9	0.2	0.2	0.2	0.2	0.3	0.3	1.1	0.3	0.3	0.5
STD DEV	1.2	0.3	0.3	0.3	0.5	0	0.6	1.2	1	0.5	0.4	1.3	0.9	0.5	0.5	0.5	0.5	0.5	0.5	1	0.5	0.5	0.7



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of Squadrons with response
120 days	36%
100 days	45%
80 days	9%
50 days	9%

Aircraft MCAPP cost should be less than:

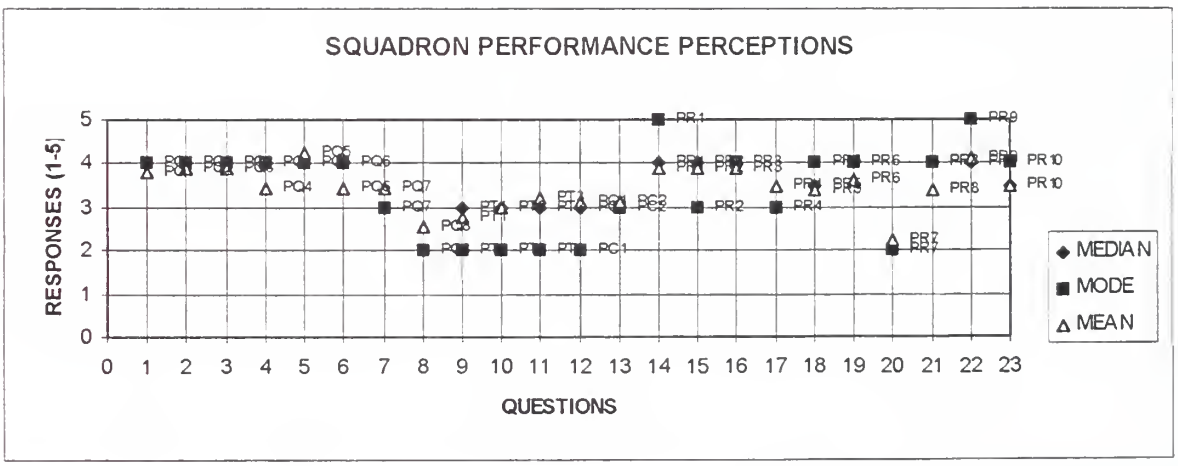
$(000)	% of Squadrons with response
$700K	18%
$500K	36%
$300K	36%
$100K	10%

It should be noted that many of the Squadrons' written comments stated that they had little understanding of the cost issues associated with MCAPP.

The following chart and graph show the performance perception responses received from Squadrons:

SQUADRON PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	4	4	4	4	4	4	3	2	3	3	3	3	3	4	4	4	3	3.5	4	2	4	4	3.5
MODE	4	4	4	4	4	4	3	2	2	2	2	2	3	5	3	4	3	4	4	2	4	5	4
MEAN	3.8	3.9	3.9	3.4	4.2	3.4	3.4	2.6	2.8	3	3.2	3.1	3.1	3.9	3.9	3.9	3.5	3.4	3.6	2.3	3.4	4.1	3.5
VARIANCE	1.9	0.9	0.9	1.5	0.2	1	0.8	0.5	0.7	1.8	1.4	1.1	0.6	1.3	0.7	1	1.1	1.1	0.8	1.1	0.8	0.7	0.29
STD DEV	1.4	0.9	0.9	1.2	0.4	1	0.9	0.7	0.8	1.3	1.2	1.1	0.8	1.1	0.8	1	1.1	1.1	0.9	1	0.9	0.8	0.53



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	% of Squadrons with response
Very Poor	0%
Poor	0%
Fair	12%
Good	63%
Excellent	25%

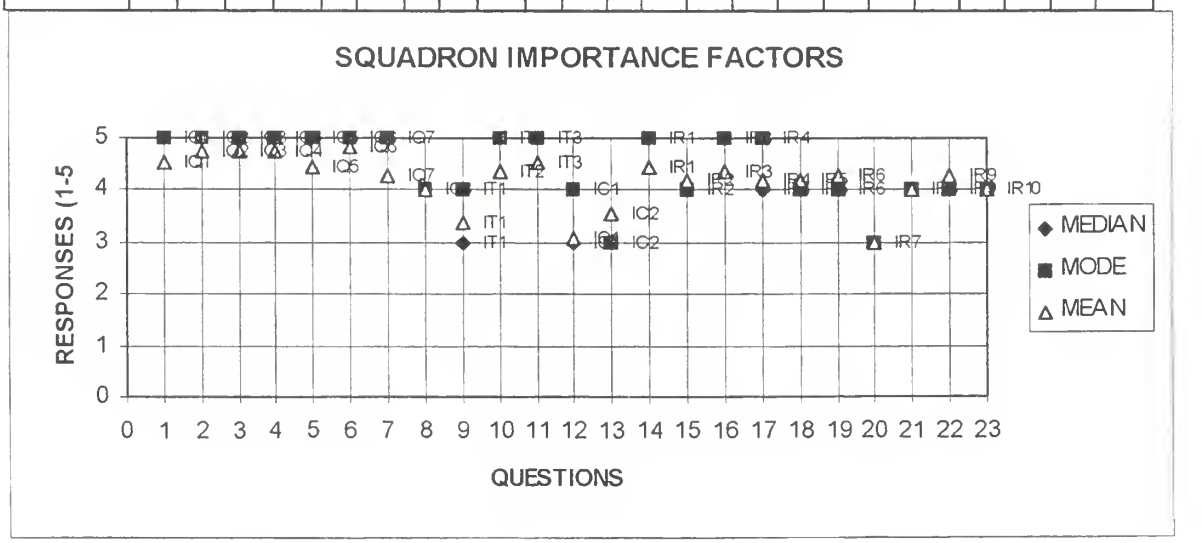
My feelings towards NADEP NI's services can be best described as:

Response	% of Squadrons with response
Very Unsatisfied	0%
Unsatisfied	12%
Neutral	12%
Satisfied	76%
Very Satisfied	0%

The following chart and graph show the importance factor responses received from Squadrons:

SQUADRON IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	5	5	5	5	5	5	5	4	3	5	5	3	3	5	4	5	4	4	4	3	4	4	4
MODE	5	5	5	5	5	5	5	4	4	5	5	4	3	5	4	5	5	4	4	3	4	4	4
MEAN	4.5	4.7	4.7	4.7	4.5	4.8	4.3	4	3.4	4.4	4.5	3.1	3.5	4.5	4.2	4.4	4.2	4.2	4.3	3	4	4.3	4
VARIANCE	0.9	0.4	0.2	0.4	0.9	0.4	1	1	0.9	0.9	0.3	1.5	0.9	0.5	0.6	0.7	0.8	0.6	0.2	1.2	0.6	0.4	0.6
STD DEV	0.9	0.6	0.5	0.6	0.9	0.6	1	1	0.9	0.9	0.5	1.2	0.9	0.7	0.8	0.8	0.9	0.8	0.5	1.1	0.8	0.6	0.8



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

91% of Squadrons responding ranked quality first, turnaround time second and cost third.

9% of Squadrons responding ranked quality first, cost second, and turnaround time third.

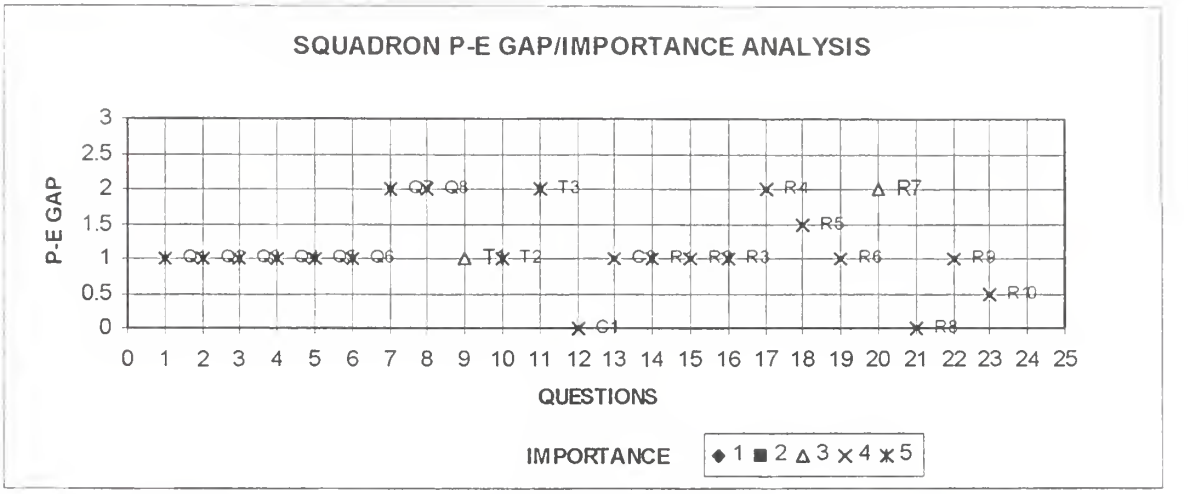
My need to understand the depot's capabilities and constraints is:

Response	**% of Squadrons with response**
Very Unimportant	9%
Unimportant	0%
Undecided	0%
Important	64%
Very Important	27%

The following chart and graph represent the results of conducting a P-E gaps/importance factor analysis from squadron responses:

SQUADRON P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	5	5	5	5	5	5	5	4	4	4	5	3	4	5	5	5	5	5	5	4	4	5	4
PERFORMANCE	4	4	4	4	4	4	3	2	3	3	3	3	3	4	4	4	3	3.5	4	2	4	4	3.5
IMPORTANCE	5	5	5	5	5	5	5	4	3	5	5	3	3	5	4	5	4	4	4	3	4	4	4
P-E GAP	1	1	1	1	1	1	2	2	1	1	2	0	1	1	1	1	2	1.5	1	2	0	1	0.5



To best improve customer service, we felt that any response with a P-E gap of more than 1 and an importance factor of 4 or 5 required the most immediate attention. P-E gaps of 1 or less generally signify satisfaction with the attribute, with some possibility for improvement. The results of this analysis show that in order to improve customer satisfaction among squadrons, NADEP NI should focus its efforts on the consistency of PACE inspections and notifying customers about any schedule changes. Other areas of improvement should include the depot's response time to customer complaints and informing customers of the specific work being performed on their aircraft as part of MCAPP. It should be noted, however, that squadrons felt that NADEP NI does an excellent job of providing a point of contact to facilitate customer complaints/requests (zero P-E gap).

Overall, the squadrons seem to be satisfied with the services they have been receiving from NADEP NI. They seem content with the current turnaround time of 108 days, as long as they are notified immediately of changes, so they can adjust their operational schedules. One attribute that had a P-E gap of two and an importance factor

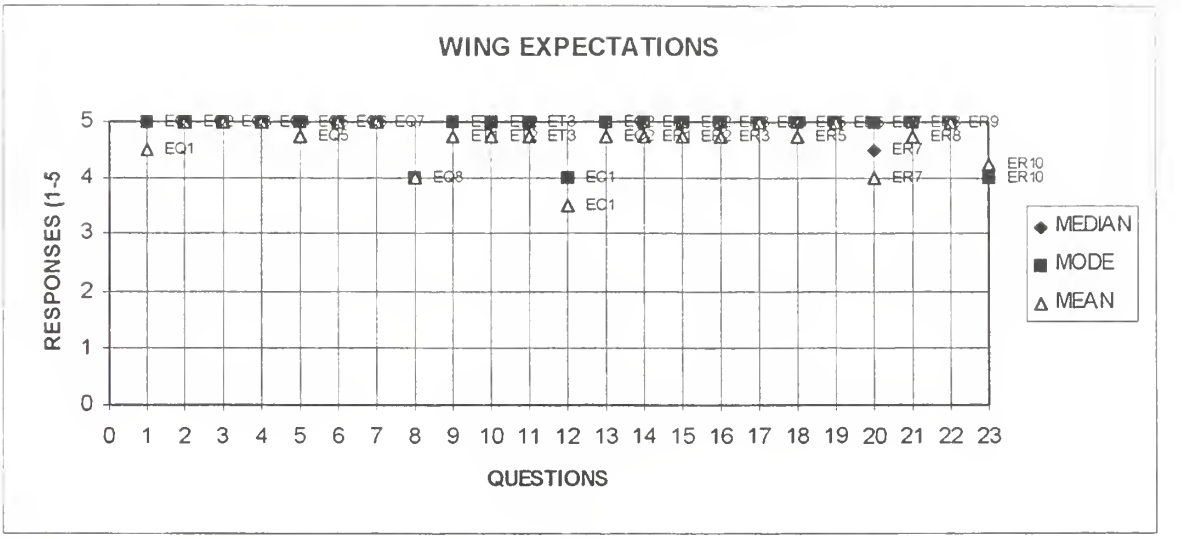
of four, was that all modifications or special rework items requested by the squadron should be accomplished during MCAPP. However, many comments from the squadrons stated that they did not understand what capabilities or constraints affect the depot's ability to complete such a request. This fact, along with the large percent of squadrons who reported that it was important to understand NADEP NI's capabilities and constraints, points to the need to educate customers about the depot's capabilities and constraints, if customers are to have realistic service expectations.

2. Wing Analysis

Of the pretest questionnaires that were sent to Wing staffs, a total of 50 percent responded. We sent multiple pretest questionnaires to each of four Wing staffs (two Navy, two Marine Corps). We received at least one response from each of the four Wings. The following chart and graph show the expectation responses received from Wings:

WING EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	5	5	5	5	5	5	5	4	5	5	5	4	5	5	5	5	5	5	5	4.5	5	5	4
MODE	5	5	5	5	5	5	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	5	4
MEAN	4.5	5	5	5	4.8	5	5	4	4.8	4.8	4.8	3.5	4.8	4.8	4.8	4.8	5	4.8	5	4	4.8	5	4.25
VARIANCE	1	0	0	0	0.3	0	0	0.7	0.3	0.3	0.3	1	0.3	0.3	0.3	0.3	0	0.3	0	2	0.3	0	0.25
STD DEV	1	0	0	0	0.5	0	0	0.8	0.5	0.5	0.5	1	0.5	0.5	0.5	0.5	0	0.5	0	1.4	0.5	0	0.5



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of Wings with response
120 days	50%
100 days	50%
80 days	0%
50 days	0%

Aircraft MCAPP cost should be less than:

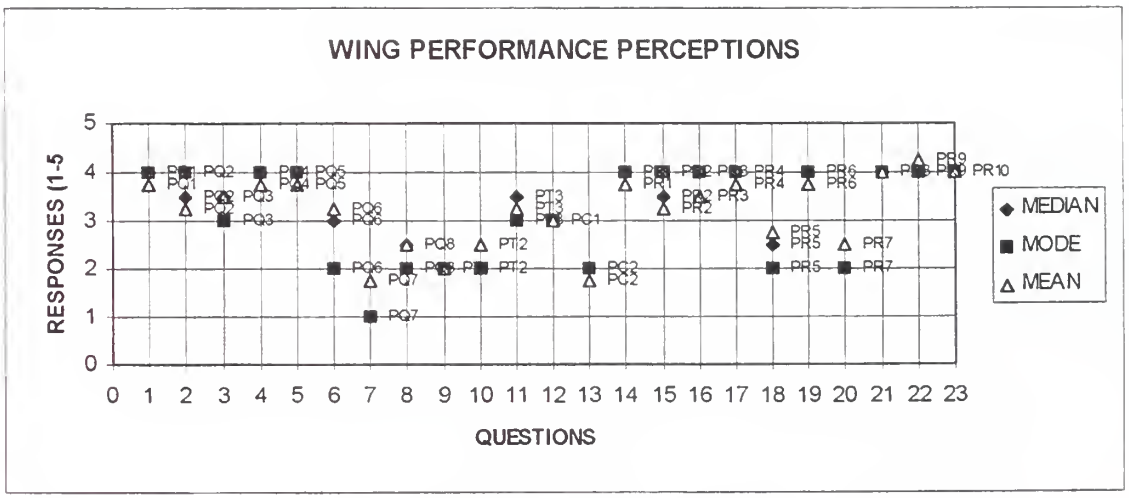
$(000)	% of Wings with response
$700K	0%
$500K	50%
$300K	50%
$100K	0%

Some of the written in comments by the Wings stated that they felt that cost should be tied to the work done and depot overhead cost should be funded separately.

The following chart and graph show the performance perception responses received from Wings:

WING PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	4	3.5	3.5	4	4	3	1	2.5	2	2	3.5	3	2	4	3.5	4	4	2.5	4	2	4	4	4
MODE	4	4	3	4	4	2	1	2	2	2	3	3	2	4	4	4	4	2	4	2	4	4	4
MEAN	3.8	3.3	3.5	3.8	3.8	3.3	1.8	2.5	2	2.5	3.3	3	1.8	3.8	3.3	3.5	3.8	2.8	3.8	2.5	4	4.3	4
VARIANCE	0.3	0.9	0.3	0.3	1.6	2.3	2.3	1.7	0.7	1	2.9	0.7	0.3	0.3	0.9	1	0.3	0.9	0.3	1	0.7	0.3	0
STD DEV	0.5	1	0.6	0.5	1.3	1.5	1.5	1.3	0.8	1	1.7	0.8	0.5	0.5	1	1	0.5	1	0.5	1	0.8	0.5	0



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	% of Wings with response
Very Poor	0%
Poor	0%
Fair	0%
Good	100%
Excellent	0%

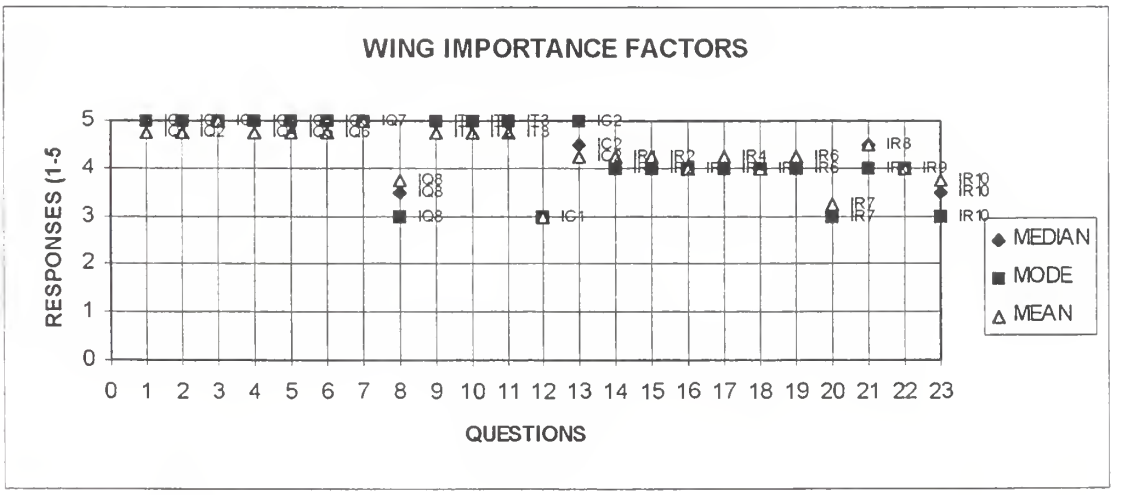
My feelings towards NADEP NI's services can be best described as:

Response	% of Wings with response
Very Unsatisfied	0%
Unsatisfied	0%
Neutral	25%
Satisfied	75%
Very Satisfied	0%

The following chart and graph show the importance factor responses received from Wings:

WING IMPORTANCE FACTORS

RESPONDENT	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	5	5	5	5	5	5	5	3.5	5	5	5	3	4.5	4	4	4	4	4	4	3	4.5	4	3.5
MODE	5	5	5	5	5	5	5	3	5	5	5	3	5	4	4	4	4	4	4	3	4	4	3
MEAN	4.8	4.8	5	4.8	4.8	4.8	5	3.8	4.8	4.8	4.8	3	4.3	4.3	4.3	4	4.3	4	4.3	3.3	4.5	4	3.75
VARIANCE	0.3	0.3	0	0.3	0.3	0.3	0	0.9	0.3	0.3	0.3	0.7	0.9	0.3	0.3	0	0.3	0.7	0.3	0.3	0.3	0.7	0.92
STD DEV	0.5	0.5	0	0.5	0.5	0.5	0	1	0.5	0.5	0.5	0.8	1	0.5	0.5	0	0.5	0.8	0.5	0.5	0.6	0.8	0.96



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

75% of Wings responding ranked quality first, turnaround time second and cost third.

25% of Wings responding ranked quality first, cost second, and turnaround time third.

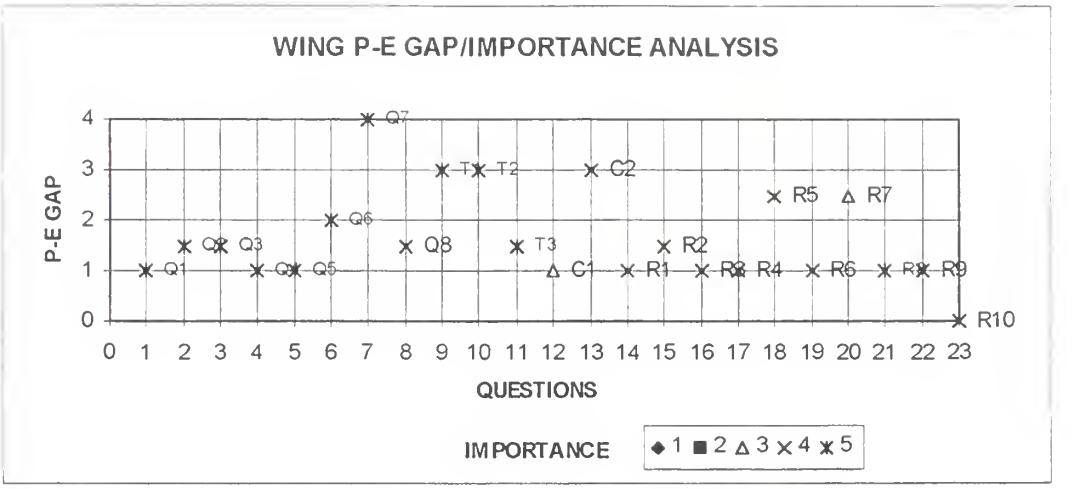
My need to understand the depot's capabilities and constraints is:

Response	**% of Wings with response**
Very Unimportant	0%
Unimportant	0%
Undecided	0%
Important	25%
Very Important	75%

The following chart and graph represent the results of conducting a P-E gaps/importance factor analysis from Wing responses:

WING P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	5	5	5	5	5	5	5	4	5	5	5	4	5	5	5	5	5	5	5	5	5	5	4
PERFORMANCE	4	4	4	4	4	3	1	3	2	2	4	3	2	4	4	4	4	3	4	2	4	4	4
IMPORTANCE	5	5	5	5	5	5	5	4	5	5	5	3	5	4	4	4	4	4	4	3	5	4	3.5
P-E GAP	1	2	2	1	1	2	4	2	3	3	2	1	3	1	2	1	1	3	1	3	1	1	0


WING P-E GAP/IMPORTANCE ANALYSIS
P-E GAP
QUESTIONS
IMPORTANCE
1 2 3 4 5
Q1 Q2 Q3 Q4 Q5 Q6 Q7 Q8
T1 T2 T3
C1 C2
R1 R2 R3 R4 R5 R6 R7 R8 R9 R10

The results of this analysis show that in order to improve customer satisfaction among Wings, as with Squadrons, NADEP NI should focus its efforts on the consistency of PACE inspections. Wings also were concerned about all of the turnaround time attributes. They felt there was room for improvement in not impacting on operational requirements and completeing aircraft on schedule, and to a lesser degree being notified of schedule changes. Other areas of improvement included Foreign object damage (FOD), fewer quality defects and a better paint job. As noted earlier, several respondents felt that cost should be associated with actual work completed on the aircraft.

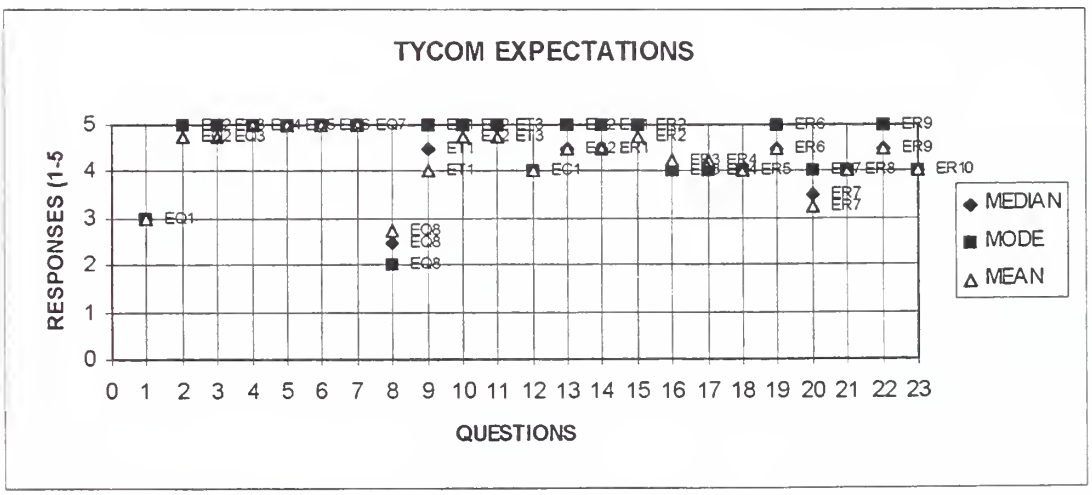
Overall, the wings seem to be satisfied with the services they have been receiving from NADEP NI. They seem fairly content with the current turnaround time of 108 days. However, half of the respondents felt this could be improved All wing respondents felt that it was important or very important for them to understand NADEP NI's capabilities and constraints. Once again, this points to the need to educate customers about depot capabilities and constraints, if the depot wishes its customers to have realistic service expectations.

3. TYCOM Analysis

Of the pretest questionnaires that were sent to TYCOMs, a total of 66 percent responsed. However, as with the wings, we received at least two responses from each TYCOM who was sent a questionnaire. The following chart and graph show the expectation responses received from TYCOMs:

TYCOM EXPECTATIONS

QUESTIONS	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	3	5	5	5	5	5	5	2.5	4.5	5	5	4	4.5	4.5	5	4	4	4	4.5	3.5	4	4.5	4
MODE	3	5	5	5	5	5	5	2	5	5	5	4	5	5	5	4	4	4	5	4	4	5	4
MEAN	3	4.8	4.8	5	5	5	5	2.8	4	4.8	4.8	4	4.5	4.5	4.8	4.3	4.3	4	4.5	3.3	4	4.5	4
VARIANCE	3.3	0.3	0.3	0	0	0	0	0.9	2	0.3	0.3	0	0.3	0.3	0.3	0.3	0.3	0.7	0.3	0.9	0.7	0.3	0.667
STD DEV	1.8	0.5	0.5	0	0	0	0	1	1.4	0.5	0.5	0	0.6	0.6	0.5	0.5	0.5	0.8	0.6	1	0.8	0.6	0.816



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of TYCOMs with response
120 days	25%
100 days	50%
80 days	25%
50 days	0%

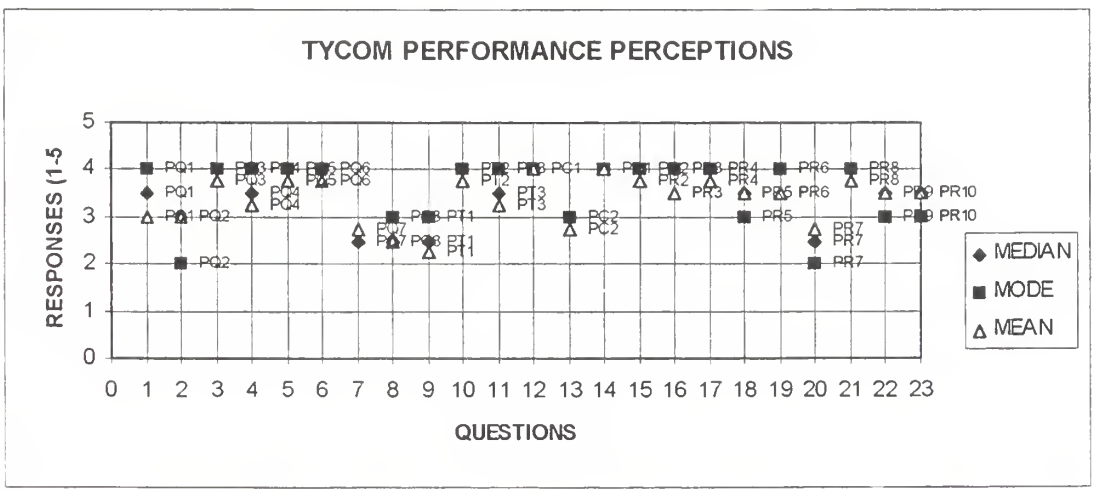
Aircraft MCAPP cost should be less than:

$(000)	% of Wings with response
$700K	0%
$500K	75%
$300K	25%
$100K	0%

The following chart and graph show the performance perception responses received from TYCOMs:

TYCOM PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	3.5	3	4	3.5	4	4	2.5	2.5	2.5	4	3.5	4	3	4	4	4	4	3.5	4	2.5	4	3.5	3.5
MODE	4	2	4	4	4	4	2	3	3	4	4	4	3	4	4	4	4	3	4	2	4	3	3
MEAN	3	3	3.8	3.3	3.8	3.8	2.8	2.5	2.3	3.8	3.3	4	2.8	4	3.8	3.5	3.8	3.5	3.5	2.8	3.8	3.5	3.5
VARIANCE	2	1.3	0.3	0.9	0.3	0.3	2.9	0.3	0.9	1.6	0.9	0	1.6	0.7	0.3	1	0.3	0.3	1	0.9	0.3	0.3	0.33
STD DEV	1.4	1.2	0.5	1	0.5	0.5	1.7	0.6	1	1.3	1	0	1.3	0.8	0.5	1	0.5	0.6	1	1	0.5	0.6	0.58



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	% of TYCOMs with response
Very Poor	0%
Poor	0%
Fair	50%
Good	0%
Excellent	50%

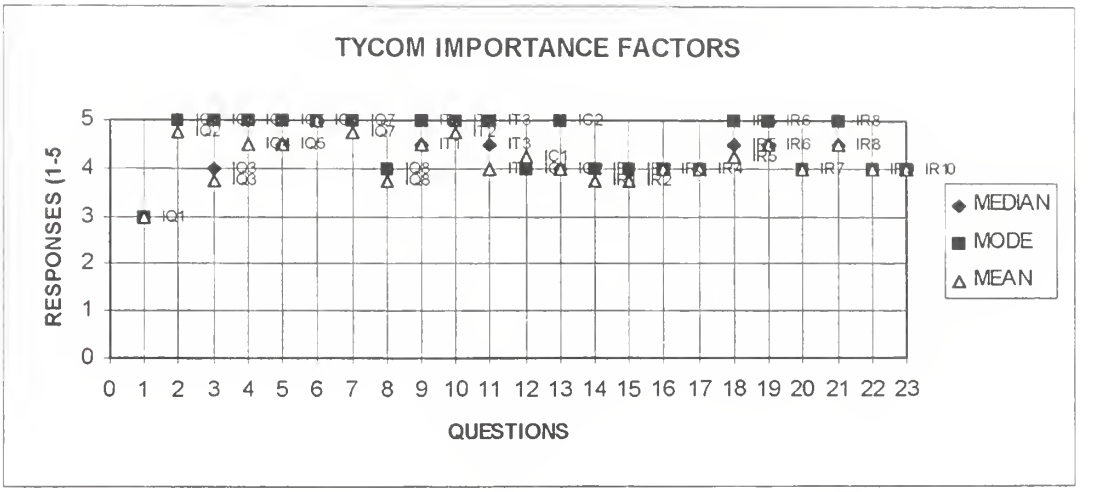
My feelings towards NADEP NI's services can be best described as:

Response	% of TYCOMs with response
Very Unsatisfied	0%
Unsatisfied	0%
Neutral	50%
Satisfied	0%
Very Satisfied	50%

The following chart and graph show the importance factor responses received from TYCOMs:

TYCOM IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	3	5	4	5	4 5	5	5	4	4.5	5	4.5	4	4	4	4	4	4	4.5	4.5	4	4.5	4	4
MODE	3	5	5	5	5	5	5	4	5	5	5	4	5	4	4	4	4	5	5	4	5	4	4
MEAN	3	4 8	3 8	4.5	4 5	5	4.8	3 8	4 5	4.8	4	4 3	4	3.8	3.8	4	4	4.3	4.5	4	4.5	4	4
VARIANCE	3.3	0.3	2 3	1	0 3	0	0.3	1.6	0 3	0.3	2	0 3	1.3	0.3	0.3	0.7	0.7	0.9	0 3	0.7	0.3	0.7	0.67
STD DEV	1.8	0.5	1.5	1	0.6	0	0.5	1.3	0.6	0.5	1.4	0 5	1.2	0.5	0.5	0.8	0.8	1	0.6	0.8	0.6	0.8	0.82



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

75% of TYCOMs responding ranked quality first, turnaround time second and cost third.

25% of TYCOMs responding ranked quality first, cost second, and turnaround time third.

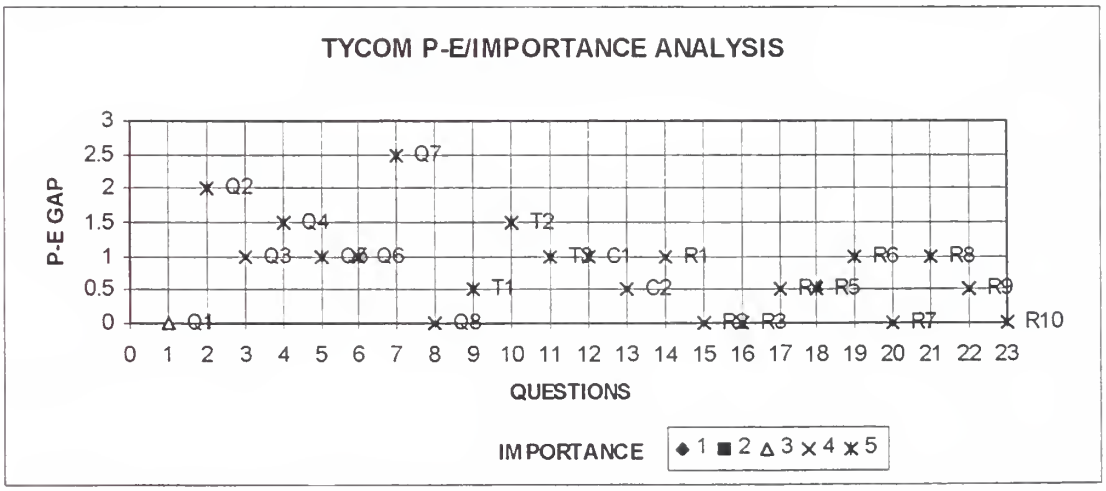
My need to understand the depot's capabilities and constraints is:

Response	**% of TYCOMs with response**
Very Unimportant	0%
Unimportant	0%
Undecided	0%
Important	25%
Very Important	75%

The following chart and graph represent the results of conducting a P-E gaps/Importance factor analysis from TYCOM responses:

TYCOM P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	3	5	5	5	5	5	5	2.5	4.5	5	5	4	4.5	5	4	4	4	4.5	3.5	4	4.5	4	4
PERFORMANCE	3	3	4	3.5	4	4	2.5	2.5	4	3.5	4	3	4	4	4	4	3.5	4	2.5	4	3.5	3.5	4
IMPORTANCE	3	5	4	5	4.5	5	5	4	4.5	5	4.5	4	4	4	4	4	4	4.5	4.5	4	4.5	4	4
P-E GAP	0	2	1	1.5	1	1	2.5	0	0.5	1.5	1	1	0.5	1	0	0	0.5	0.5	1	0	1	0.5	0



The results of this analysis show that to improve customer satisfaction among TYCOMs, as with Wings and Squadrons, NADEP NI should focus its efforts on the consistency of PACE inspections. TYCOMs are also concerned about all the attributes of turnaround time. They especially felt there was room for improvement in completing aircraft on schedule. Other areas of improvement include the aircraft having fewer quality defects and delivering discrepancy free aircraft logbooks and records.

There was a definite split among the TYCOMs about whether they were satisfied with the services they have received from NADEP NI. Fifty percent seemed to be

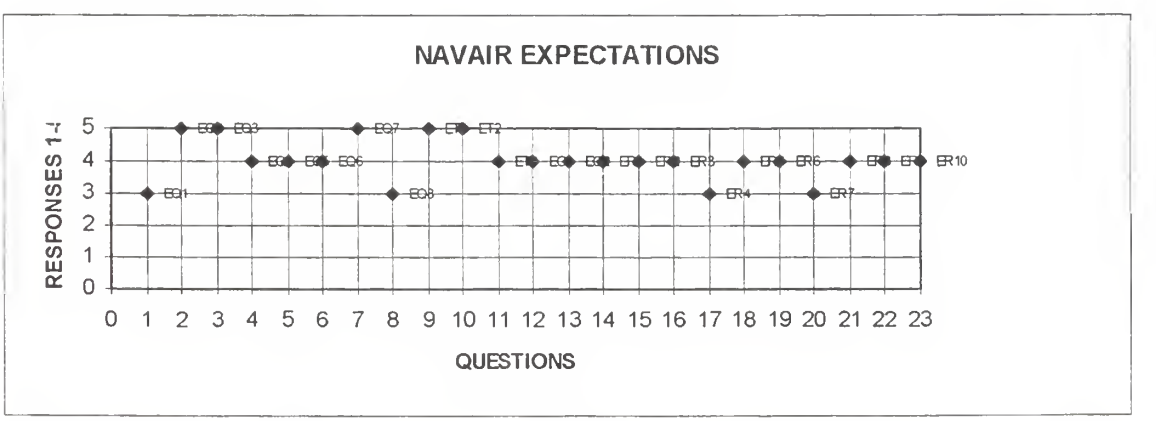
extremely satisfied, while the other fifty percent seemed to be neutral on the subject. Of all customer types, the TYCOM's seemed the least content with the current turnaround time of 108 days, with 75% of all respondents stating this standard could be improved. All respondents felt that it was important or very important for them to understand the capabilities and constraints of NADEP NI. This again points to the need to educate customers about the depot's capabilities and constraints, if the depot wishes its customers to have realistic service expectations.

4. NAVAIR Analysis

Pretest questionnaire were sent to offices within NAVAIR Code 6.0, Deputy Director for Operations, and NAVAIR 3.1.1.1C, the F/A-18 Assistant Program Manager, Logistics (F/A-18 APML). Of the pretest questionnaires sent to NAVAIR, a total of 50 percent responded. The following chart and graph show the expectation responses received from NAVAIR:

NAVAIR EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
RESPONSE	3	5	5	4	4	4	5	3	5	5	4	4	4	4	4	4	3	4	4	3	4	4	4



The results of the "other" section of the expectations part of the questionnaire were as follows:

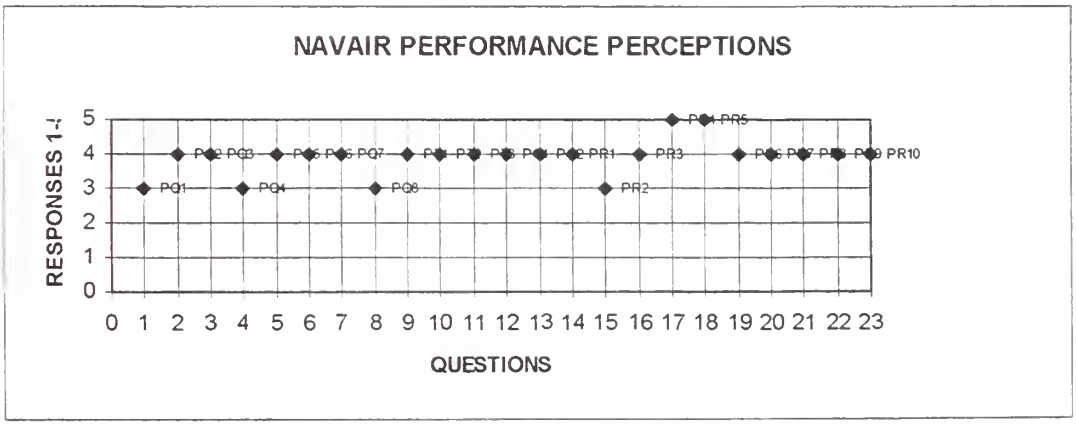
Aircraft should be returned from MCAPP in less than: **100 DAYS**

Aircraft MCAPP cost should be less than: **$500K**

The following chart and graph show the performance perception responses received from NAVAIR:

NAVAIR PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
RESPONSE	3	4	4	3	4	4	4	3	4	4	4	4	4	4	3	4	5	5	4	4	4	4	4



The results of the "other" section of the performance perception part of the questionnaire were as follows:

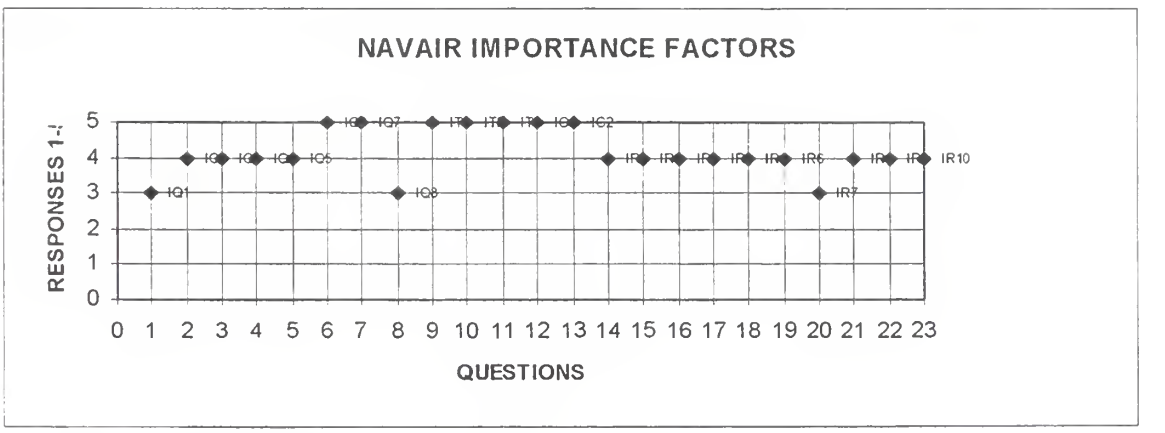
The overall quality of NADEP NI's F/A-18 maintenance program is: **EXCELLENT**

My feelings towards NADEP NI's services can be best described as: **VERY SATISFIED**

The following chart and graph show the importance factor responses received from NAVAIR:

NAVAIR IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
RESPONSE	3	4	4	4	4	5	5	3	5	5	5	5	5	4	4	4	4	4	4	3	4	4	4



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

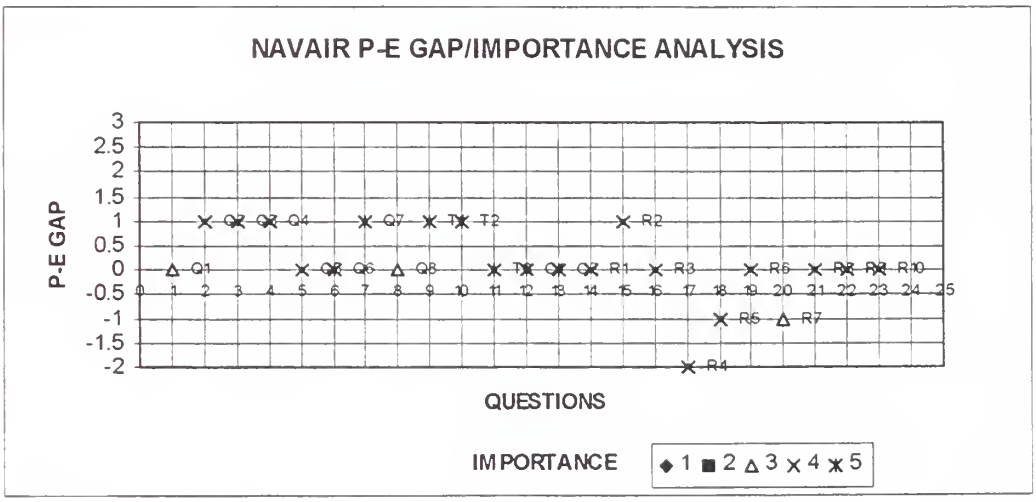
Cost first, Turnaround Time second, Quality third

My need to understand the depot's capabilities and constraints is: **IMPORTANT**

The following chart and graph represent the results of conducting a P-E gaps/Importance factor analysis from NAVAIR:

NAVAIR P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	3	5	5	4	4	4	5	3	5	5	4	4	4	4	4	4	3	4	4	3	4	4	4
PERFORMANCE	3	4	4	3	4	4	4	3	4	4	4	4	4	4	3	4	5	5	4	4	4	4	4
IMPORTANCE	3	4	4	4	4	5	5	3	5	5	5	5	5	4	4	4	4	4	4	3	4	4	4
P-E GAP	0	1	1	1	0	0	1	0	1	1	0	0	0	0	1	0	-2	-1	0	-1	0	0	0



The results of this analysis show that NAVAIR had no P-E gaps greater than one. There were only three attributes with a P-E gap of 1 and an importance factor of five. They are consistent PACE inspection criteria, depot maintenance not impacting operational requirements, and aircraft completing depot maintenance on schedule. These would be the areas that NADEP NI should focus on to improve NAVAIR's customer satisfaction. This analysis shows that NAVAIR is very satisfied with NADEP NI's performance. There were three attributes that actually had a negative P-E gap. The other interesting fact is that NAVAIR ranked cost first in importance and quality third. They were the only customer not to rank quality first.

F. GEOGRAPHIC ANALYSIS

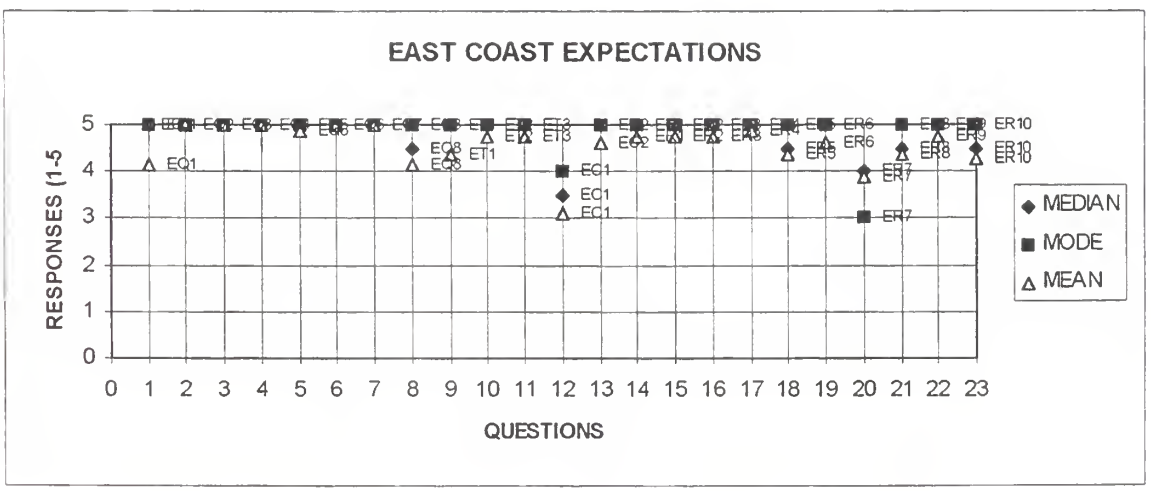
The second analysis was conducted by location of customer. Customers were grouped into east or west coast according to their location. For the purpose of this analysis, NAVAIR's response was omitted as was the response from the Naval Flight Demonstration Squadron. This analysis shows the P-E gap and importance factors of customers located on each coast and compares them with one another. We began by analyzing east coast responses.

1. East Coast Analysis

The following chart and graph show the expectation responses received from customers on the east coast:

EAST COAST EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	5	5	5	5	5	5	5	4.5	5	5	5	3.5	5	5	5	5	5	4.5	5	4	4.5	5	4.5
MODE	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	3	5	5	5
MEAN	4.1	5	5	5	4.9	5	5	4.1	4.4	4.8	4.8	3.1	4.6	4.8	4.8	4.8	4.9	4.4	4.6	3.9	4.4	4.8	4.3
VARIANCE	2.7	0	0	0	0.1	0	0	1.3	1.1	0.2	0.2	1.8	0.6	0.2	0.2	0.2	0.1	0.6	0.3	0.7	0.6	0.2	0.8
STD DEV	1.6	0	0	0	0.4	0	0	1.1	1.1	0.5	0.5	1.4	0.7	0.5	0.5	0.5	0.4	0.7	0.5	0.8	0.7	0.5	0.9



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of East Coast with response
120 days	50%
100 days	38%
80 days	12%
50 days	0%

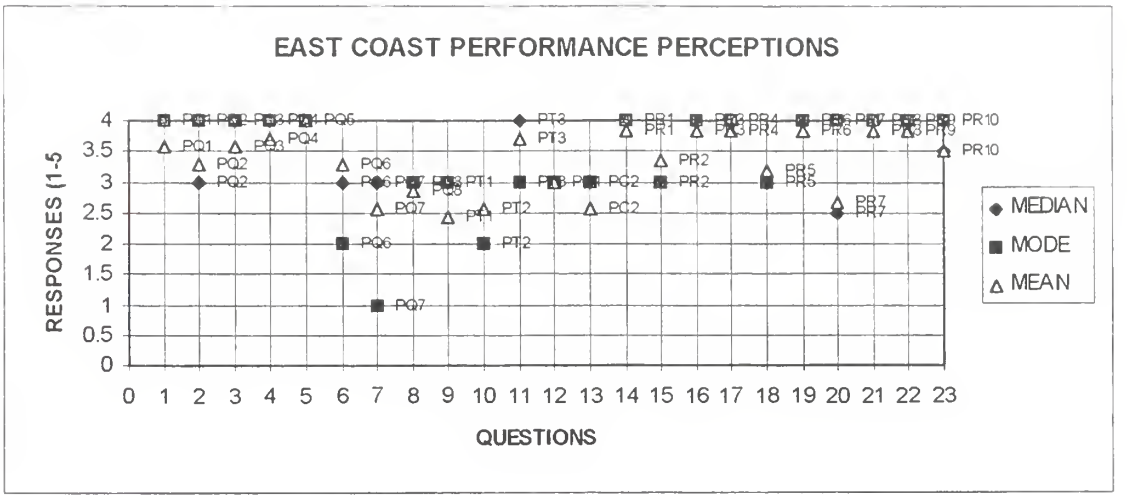
Aircraft MCAPP cost should be less than:

$(000)	% of East Coast with response
$700K	12%
$500K	50%
$300K	38%
$100K	0%

The following chart and graph show the performance perception responses received from east coast customers:

EAST COAST PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	4	3	4	4	4	3	3	3	3	2	4	3	3	4	3	4	4	3	4	2.5	4	4	3.5
MODE	4	4	4	4	4	2	1	3	3	2	3	3	3	4	3	4	4	3	4	4	4	4	4
MEAN	3.6	3.3	3.6	3.7	4	3.3	2.6	2.9	2.4	2.6	3.7	3	2.6	3.8	3.3	3.8	3.8	3.2	3.8	2.7	3.8	3.8	3.5
VARIANCE	1	1.2	1	0.6	0.3	1.2	2.6	1.1	1.3	2	0.6	0.7	2	0.6	1.1	1	0.6	0.6	0.2	1.5	0.2	0.6	0.3
STD DEV	1	1.1	1	0.8	0.6	1.1	1.6	1.1	1.1	1.4	0.8	0.8	1.4	0.8	1	1	0.8	0.8	0.4	1.2	0.4	0.8	0.5



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	% of East Coast with response
Very Poor	0%
Poor	0%
Fair	33%
Good	50%
Excellent	17%

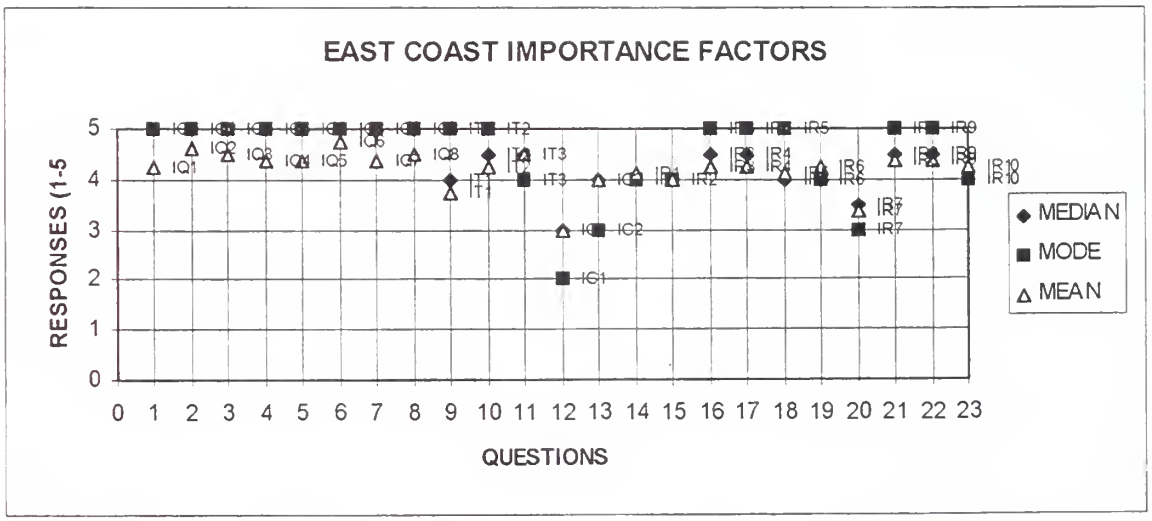
My feelings towards NADEP NI's services can be best described as:

Response	% of East Coast with response
Very Unsatisfied	0%
Unsatisfied	0%
Neutral	50%
Satisfied	50%
Very Satisfied	0%

The following chart and graph show the importance factor responses received from east coast customers:

EAST COAST IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	5	5	5	5	5	5	5	5	4	4.5	4 5	3	4	4	4	4 5	4 5	4	4	3.5	4 5	4.5	4
MODE	5	5	5	5	5	5	5	5	5	5	4	2	3	4	4	5	5	5	4	3	5	5	4
MEAN	4.3	4 6	4.5	4 4	4 4	4 8	4 4	4.5	3.8	4 3	4.5	3	4	4 1	4	4.3	4.3	4 1	4.3	3.4	4.4	4.4	4 25
VARIANCE	1.9	0.6	0 6	0.8	1.1	0.5	1.1	0.6	1.6	1.1	0.3	0 9	1.1	0.7	0 6	0.8	0.8	0.7	0.2	1.4	0.6	0.6	0.5
STD DEV	1 4	0 7	0 8	0.9	1.1	0.7	1.1	0 8	1.3	1	0.5	0 9	1.1	0.8	0 8	0.9	0.9	0.8	0.5	1.2	0.7	0.7	0 71



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

87% of east coast responses ranked quality first, turnaround time second and cost third.

13% of east coast responses ranked quality first, cost second, and turnaround time third.

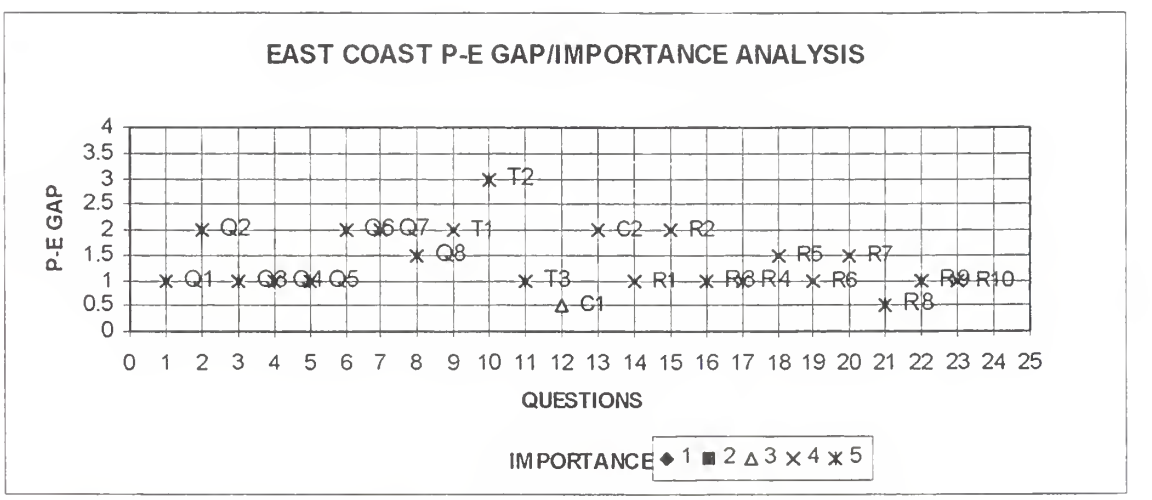
My need to understand the depot's capabilities and constraints is:

Response	% of East Coast with response
Very Unimportant	0%
Unimportant	0%
Undecided	0%
Important	63%
Very Important	37%

The following chart and graph represent the results of conducting a P-E gaps/Importance factor analysis from east coast responses:

EAST COAST P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	5	5	5	5	5	5	5	4.5	5	5	5	3.5	5	5	5	5	5	4.5	5	4	4.5	5	4.5
PERFORMANCE	4	3	4	4	4	3	3	3	3	2	4	3	3	4	3	4	4	3	4	2.5	4	4	3.5
IMPORTANCE	5	5	5	5	5	5	5	5	4	4.5	4.5	3	4	4	4	4.5	4.5	4	4	3.5	4.5	4.5	4
P-E GAP	1	2	1	1	1	2	2	1.5	2	3	1	0.5	2	1	2	1	1	1.5	1	1.5	0.5	1	1



The results of this analysis show that in order to improve customer satisfaction among east coast customers, NADEP NI should focus its efforts on ensuring aircraft complete MCAPP on schedule, improving the consistency of PACE inspections, ensuring aircraft are free of quality defects and are FOD-free. East coast customers had a total of

ten attributes with a P-E gap greater than one, with five of them having an importance factor of five.

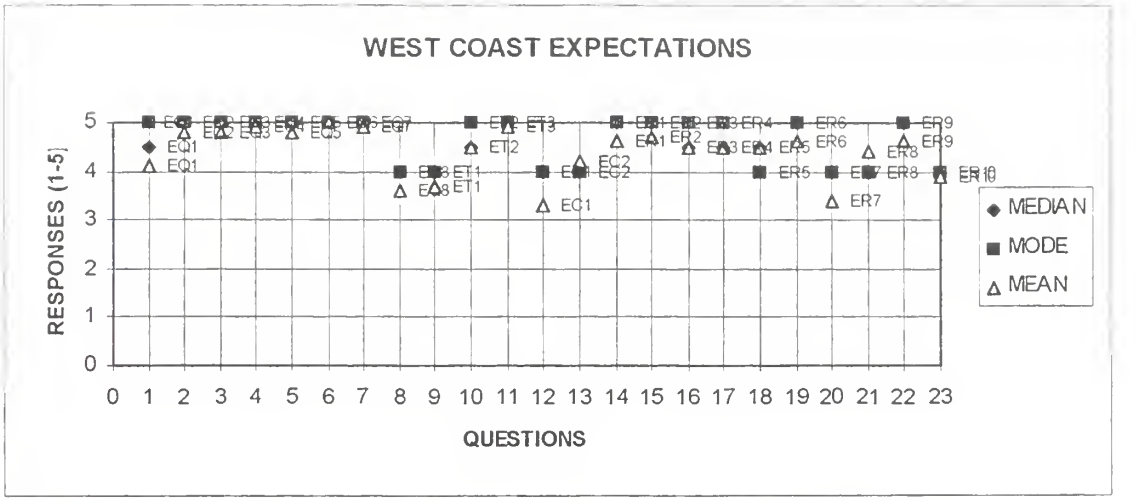
Overall, east coast customers seem to be neutral to satisfied with NADEP NI's services. They seem content with the current turnaround time of 108 days, as long as aircraft complete MCAPP as scheduled. Other attributes that need improvment are accomplishing the modifications or special rework requested during MCAPP, improving procedures for doing business with the depot, informing the customers of the specific work performed during MCAPP and the depot visiting customers often enough to assess their needs.

2. West Coast Analysis

The following chart and graph show the expectation responses received from customers on the west coast:

WEST COAST EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	4.5	5	5	5	5	5	5	4	4	4.5	5	4	4	5	5	4.5	4.5	4.5	5	4	4	5	4
MODE	5	5	5	5	5	5	5	4	4	5	5	4	4	5	5	5	5	4	5	4	4	5	4
MEAN	4.1	4.8	4.8	4.9	4.8	5	4.9	3.6	3.7	4.5	4.9	3.3	4.2	4.6	4.7	4.5	4.5	4.5	4.6	3.4	4.4	4.6	3.9
VARIANCE	1.7	0.2	0.2	0.1	0.2	0	0.1	1.2	1.1	0.3	0.1	0.9	0.6	0.3	0.2	0.3	0.3	0.3	0.3	1.6	0.3	0.3	0.1
STD DEV	1.3	0.4	0.4	0.3	0.4	0	0.3	1.1	1.1	0.5	0.3	0.9	0.8	0.5	0.5	0.5	0.5	0.5	0.5	1.3	0.5	0.5	0.32



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of West Coast with response
120 days	30%
100 days	50%
80 days	10%
50 days	10%

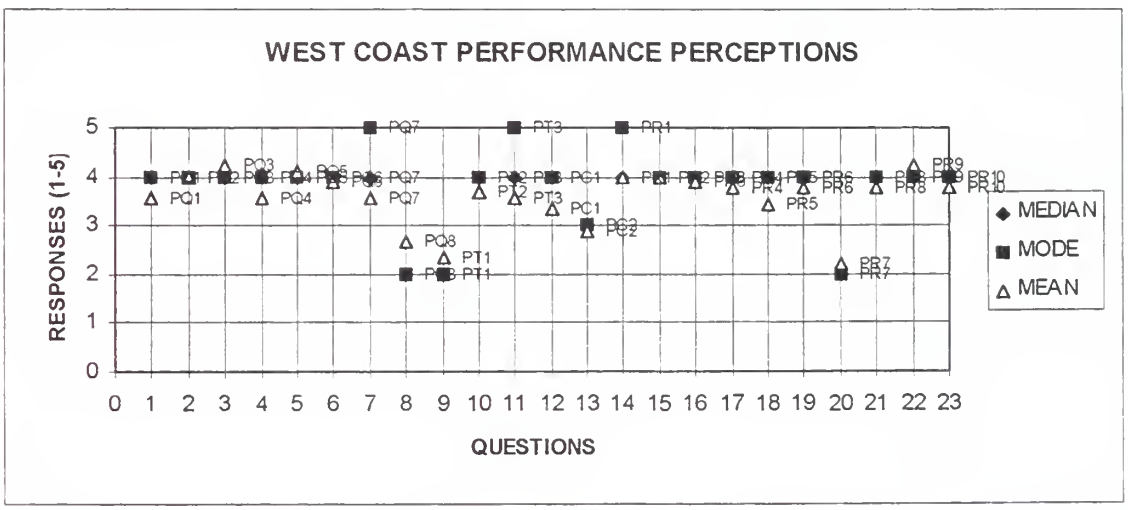
Aircraft MCAPP cost should be less than:

$(000)	% of West Coast with response
$700K	10%
$500K	50%
$300K	30%
$100K	10%

The following chart and graph show the performance perception responses received from west coast customers:

WEST COAST PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	4	4	4	4	4	4	4	2	2	4	4	4	3	4	4	4	4	4	4	2	4	4	4
MODE	4	4	4	4	4	4	5	2	2	4	5	4	3	5	4	4	4	4	4	2	4	4	4
MEAN	3.6	4	4.2	3.6	4.1	3.9	3.6	2.7	2.3	3.7	3.6	3.3	2.9	4	4	3.9	3.8	3.4	3.8	2.2	3.8	4.2	3.78
VARIANCE	2.3	0.8	0.4	1.5	0.9	1.4	2	1	0.5	1.3	2.5	0.8	0.6	1.3	0.5	0.6	0.4	1	0.9	0.7	0.7	0.4	0.19
STD DEV	1.5	0.9	0.7	1.2	0.9	1.2	1.4	1	0.7	1.1	1.6	0.9	0.8	1.1	0.7	0.8	0.7	1	1	0.8	0.8	0.7	0.44



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	% of West Coast with response
Very Poor	0%
Poor	0%
Fair	11%
Good	56%
Excellent	33%

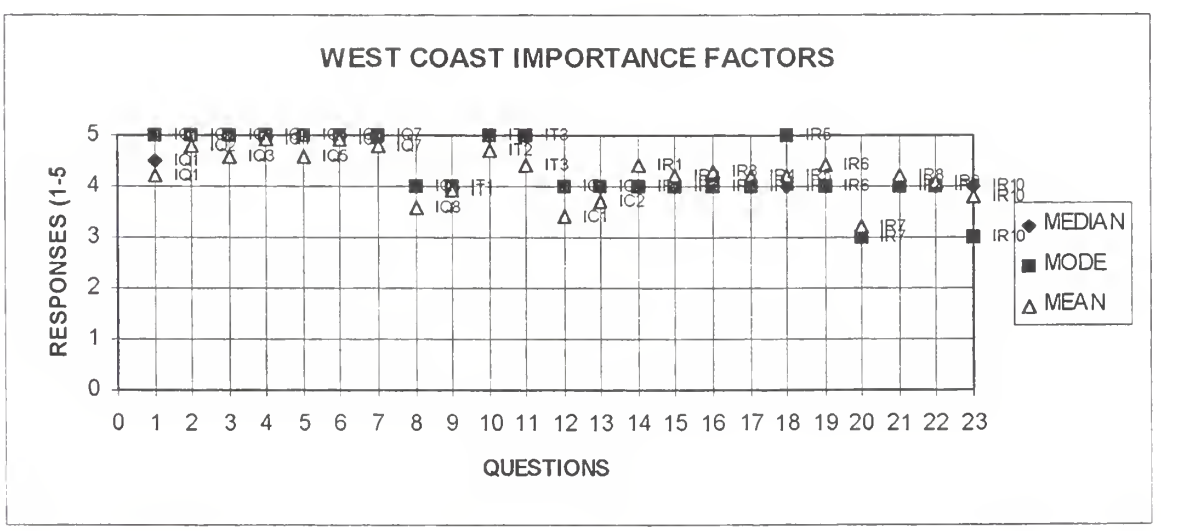
My feelings towards NADEP NI's services can be best described as:

Response	% of West Coast with response
Very Unsatisfied	0%
Unsatisfied	11%
Neutral	11%
Satisfied	56%
Very Satisfied	22%

The following chart and graph show the importance factor responses received from west coast customers:

WEST COAST IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	4.5	5	5	5	5	5	5	4	4	5	5	4	4	4	4	4	4	4	4	3	4	4	4
MODE	5	5	5	5	5	5	5	4	4	5	5	4	4	4	4	4	4	5	4	3	4	4	3
MEAN	4.2	4.8	4.6	4.9	4.6	4.9	4.8	3.6	3.9	4.7	4.4	3.4	3.7	4.4	4.2	4.3	4.2	4.2	4.4	3.2	4.2	4.1	3.8
VARIANCE	1.5	0.2	0.9	0.1	0.3	0.1	0.2	0.7	0.5	0.2	0.9	1.4	0.9	0.3	0.4	0.2	0.4	0.6	0.3	0.8	0.4	0.3	0.62
STD DEV	1.2	0.4	1	0.3	0.5	0.3	0.4	0.8	0.7	0.5	1	1.2	0.9	0.5	0.6	0.5	0.6	0.8	0.5	0.9	0.6	0.6	0.79



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

80% of west coast responses ranked quality first, turnaround time second and cost third.

20% of west coast responses ranked quality first, cost second, and turnaround time third.

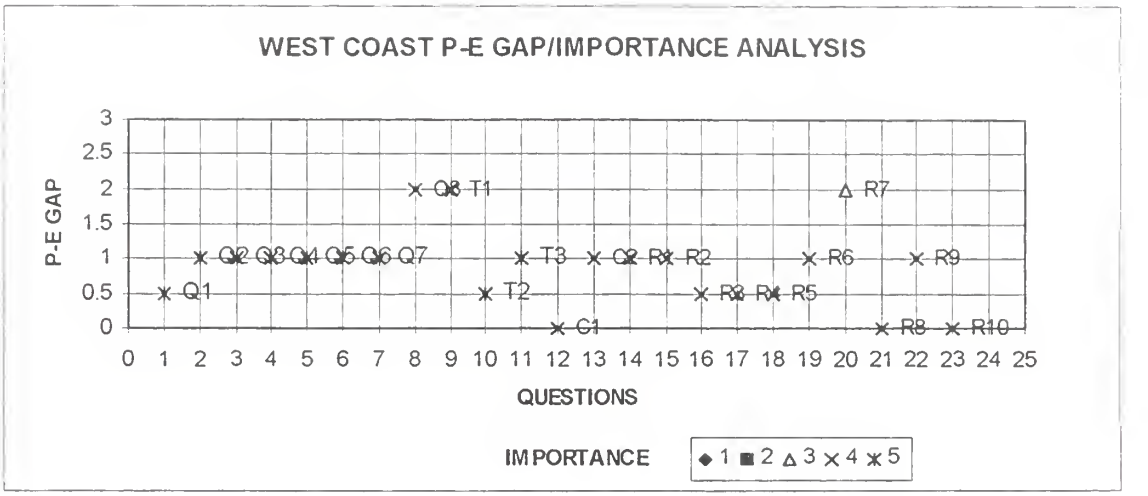
My need to understand the depot's capabilities and constraints is:

Response	**% of West Coast with response**
Very Unimportant	0%
Unimportant	0%
Undecided	0%
Important	40%
Very Important	60%

The following chart and graph represent the results of conducting a P-E gaps/Importance factor analysis from west coast responses:

WEST COAST P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	4.5	5	5	5	5	5	5	4	4	4.5	5	4	4	5	5	4.5	4.5	4.5	5	4	4	5	4
PERFORMANCE	4	4	4	4	4	4	4	2	2	4	4	4	3	4	4	4	4	4	4	2	4	4	4
IMPORTANCE	4.5	5	5	5	5	5	5	4	4	5	5	4	4	4	4	4	4	4	4	3	4	4	4
P-E GAP	0.5	1	1	1	1	1	1	2	2	0.5	1	0	1	1	1	0.5	0.5	0.5	1	2	0	1	0



It is important to note that west coast customers only had three attributes with a P-E gap greater than one, with none of them having an importance factor of five. The results of this analysis show that to improve customer satisfaction among west coast customers, NADEP NI should focus its efforts on improving the attributes of completing the modifications or special rework requested during MCAPP and ensuring that depot maintenance does not impact operational requirements.

West coast customers seem to be satisfied to very satisfied with the NADEP NI's services. Overall, the west coast seemed to have a much higher level of customer satisfaction than the east coast. This could be due to the time difference. The east coast had a half a point larger P-E gap in both the response time for services and complaints. NADEP NI is on the west coast, with basically the same operating hours as customers on the west coast, which provides more time for communication and interaction.

Another significant difference was the P-E gap for aircraft completing depot maintenance on schedule. The east coast had a P-E gap of 3, while the west coast only had a P-E gap of .5. This needs to be investigated to see if this is truly a performance problem, or if east coast customers have unrealistic scheduling expectations.

G. SERVICE ANALYSIS

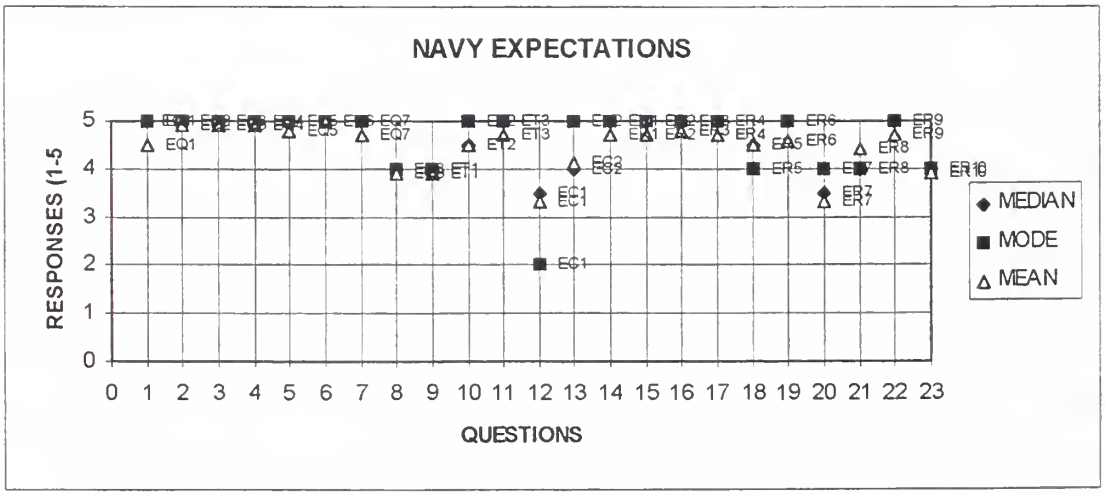
The final analysis was conducted by service of customer. Wings and Squadrons were grouped according to their service, Navy or Marine. For the purpose of this analysis NAVAIR and TYCOM responses were omitted since they support both services. This analysis shows the P-E gap and importance factors of customers in the Navy and Marines and compares each of them with one another. We begin by analyzing Navy responses.

1. Navy Analysis

The following chart and graph show the expectation responses received from customers in the Navy:

NAVY EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	5	5	5	5	5	5	5	4	4	4.5	5	3.5	4	5	5	5	5	4.5	5	3.5	4	5	4
MODE	5	5	5	5	5	5	5	4	4	5	5	2	5	5	5	5	5	4	5	4	4	5	4
MEAN	4.5	4.9	4.9	4.9	4.8	5	4.7	3.9	3.9	4.5	4.7	3.3	4.1	4.7	4.7	4.8	4.7	4.5	4.6	3.3	4.4	4.7	3.9
VARIANCE	1.6	0.1	0.1	0.1	0.2	0	0.5	1.2	0.8	0.3	0.2	1.6	0.8	0.2	0.2	0.2	0.2	0.3	0.3	1.1	0.3	0.2	0.32
STD DEV	1.3	0.3	0.3	0.3	0.4	0	0.7	1.1	0.9	0.5	0.5	1.3	0.9	0.5	0.5	0.4	0.5	0.5	0.5	1.1	0.5	0.5	0.57



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of Navy with response
120 days	40%
100 days	40%
80 days	10%
50 days	10%

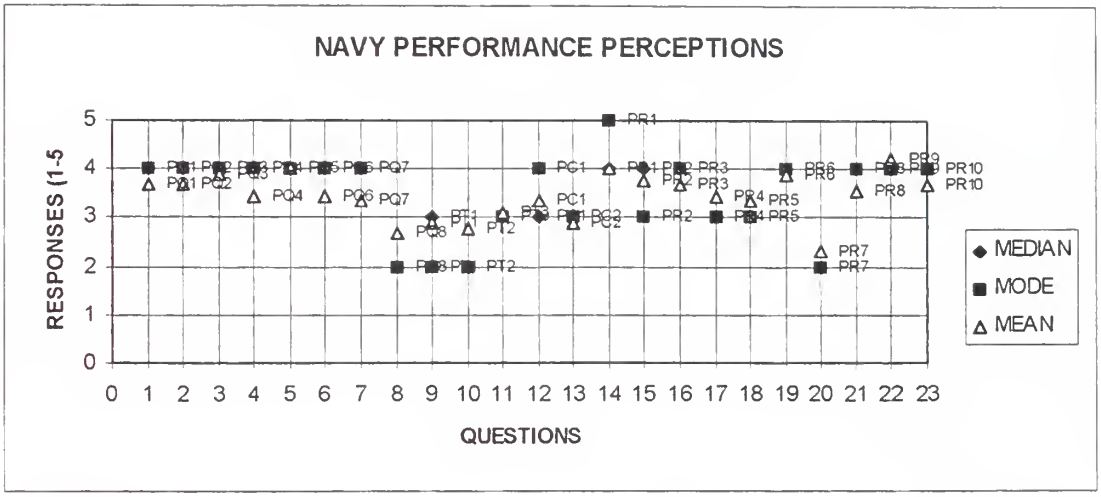
Aircraft MCAPP cost should be less than:

$(000)	% of Navy with response
$700K	10%
$500K	30%
$300K	50%
$100K	10%

The following chart and graph show the performance perception responses received from Navy customers:

NAVY PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	4	4	4	4	4	4	4	2	3	2	3	3	3	4	4	4	3	3	4	2	4	4	4
MODE	4	4	4	4	4	4	4	2	2	2	3	4	3	5	3	4	3	3	4	2	4	4	4
MEAN	3.7	3.7	3.9	3.4	4	3.4	3.3	2.7	2.9	2.8	3.1	3.3	2.9	4	3.8	3.7	3.4	3.3	3.9	2.3	3.6	4.2	3.67
VARIANCE	1.8	0.8	0.4	1.5	0.8	1	1.5	0.8	0.9	1.7	1.9	1	0.9	0.8	0.7	1.3	0.8	1	0.4	0.8	0.5	0.4	0.25
STD DEV	1.3	0.9	0.6	1.2	0.9	1	1.2	0.9	0.9	1.3	1.4	1	0.9	0.9	0.8	1.1	0.9	1	0.6	0.9	0.7	0.7	0.5



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	**% of Navy with response**
Very Poor	0%
Poor	0%
Fair	12%
Good	75%
Excellent	13%

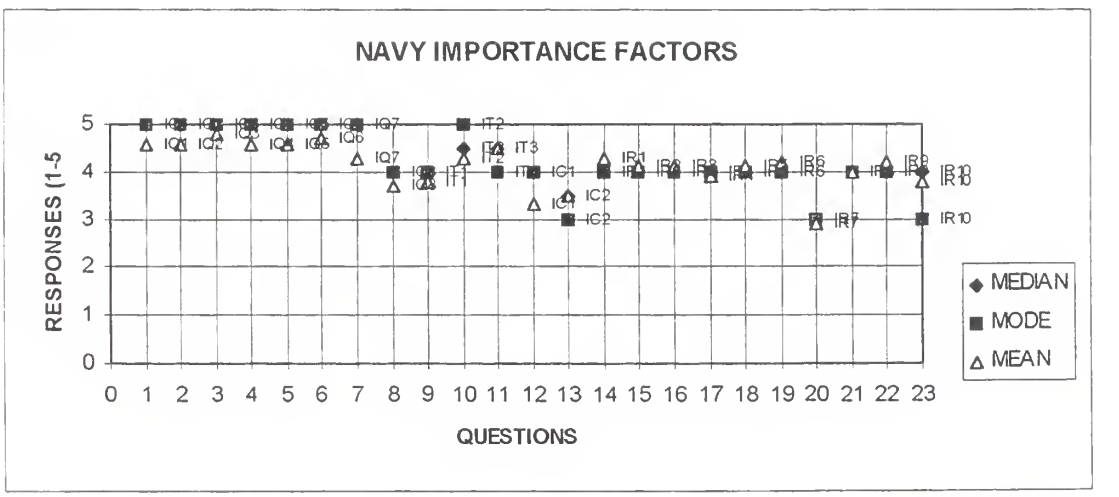
My feelings towards NADEP NI's services can be best described as:

Response	**% of Navy with response**
Very Unsatisfied	0%
Unsatisfied	12%
Neutral	13%
Satisfied	75%
Very Satisfied	0%

The following chart and graph show the importance factor responses received from Navy customers:

NAVY IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	5	5	5	5	5	5	5	4	4	4.5	4.5	4	3.5	4	4	4	4	4	4	3	4	4	4
MODE	5	5	5	5	5	5	5	4	4	5	4	4	3	4	4	4	4	4	4	3	4	4	3
MEAN	4.6	4.6	4.8	4.6	4.6	4.7	4.3	3.7	3.8	4.3	4.5	3.3	3.5	4.3	4.1	4.1	3.9	4.1	4.2	2.9	4	4.2	3.8
VARIANCE	0.9	0.5	0.2	0.5	0.3	0.5	1.1	0.9	0.8	0.9	0.3	1.6	0.7	0.5	0.5	0.5	0.5	0.3	0.2	1	0.7	0.4	0.6
STD DEV	1	0.7	0.4	0.7	0.5	0.7	1.1	0.9	0.9	0.9	0.5	1.3	0.8	0.7	0.7	0.7	0.7	0.6	0.4	1	0.8	0.6	0.8



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

80% of Navy responses ranked quality first, turnaround time second and cost third.

20% of Navy responses ranked quality first, cost second, and turnaround time third.

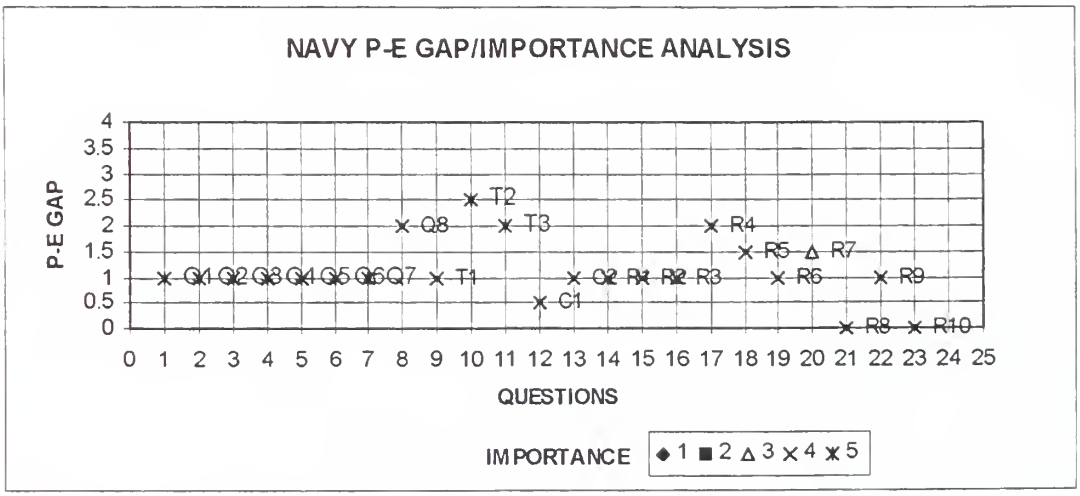
My need to understand the depot's capabilities and constraints is:

Response	% of Navy with response
Very Unimportant	10%
Unimportant	0%
Undecided	0%
Important	50%
Very Important	40%

The following chart and graph represent the results of conducting a P-E gaps/Importance factor analysis from Navy responses:

NAVY P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	5	5	5	5	5	5	5	4	4	4.5	5	3.5	4	5	5	5	5	4.5	5	3.5	4	5	4
PERFORMANCE	4	4	4	4	4	4	4	2	3	2	3	3	3	4	4	4	3	3	4	2	4	4	4
IMPORTANCE	5	5	5	5	5	5	5	4	4	4.5	4.5	4	3.5	4	4	4	4	4	4	3	4	4	4
P-E GAP	1	1	1	1	1	1	1	2	1	2.5	2	0.5	1	1	1	1	2	1.5	1	1.5	0	1	0



The results of this analysis show that in order to improve customer satisfaction among Navy customers, NADEP NI should ensure aircraft complete MCAPP on schedule and immediately notify customers of changes to scheduled completion dates. Navy

customers had a total of six attributes with a P-E gap greater than one, two of them having an importance factor of five.

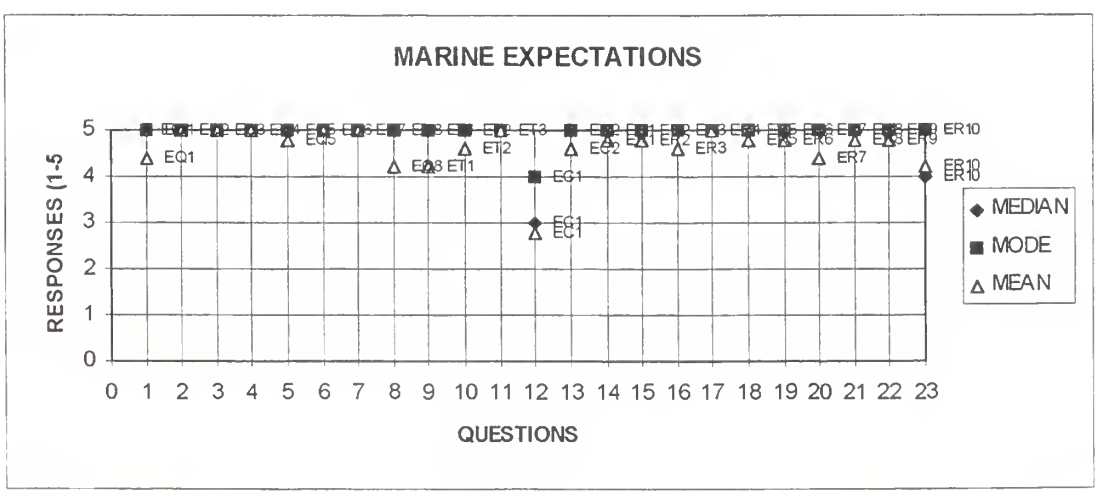
Overall, Navy customers seem to be satisfied with the NADEP NI's services. They seem content with the current turnaround time of 108 days, as long as aircraft complete MCAPP as scheduled. The other attributes that need some improvement are the depot responding in a timely manner to requests for customer complaints and informing customers of the specific work performed on their aircraft as part of MCAPP.

2. Marine Analysis

The following chart and graph show the expectation responses received from Marine customers:

MARINE EXPECTATIONS

QUESTION	EQ1	EQ2	EQ3	EQ4	EQ5	EQ6	EQ7	EQ8	ET1	ET2	ET3	EC1	EC2	ER1	ER2	ER3	ER4	ER5	ER6	ER7	ER8	ER9	ER10
MEDIAN	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	4
MODE	5	5	5	5	5	5	5	5	5	5	5	4	5	5	5	5	5	5	5	5	5	5	5
MEAN	4.4	5	5	5	4.8	5	5	4.2	4.2	4.6	5	2.8	4.6	4.8	4.8	4.6	5	4.8	4.8	4.4	4.8	4.8	4.2
VARIANCE	0.8	0	0	0	0.2	0	0	1.2	1.7	0.3	0	1.7	0.8	0.2	0.2	0.3	0	0.2	0.2	0.8	0.2	0.2	0.7
STD DEV	0.9	0	0	0	0.4	0	0	1.1	1.3	0.5	0	1.3	0.9	0.4	0.4	0.5	0	0.4	0.4	0.9	0.4	0.4	0.84



The results of the "other" section of the expectations part of the questionnaire were as follows:

Aircraft should be returned from MCAPP in less than:

# of days	% of Marines with response
120 days	40%
100 days	60%
80 days	0%
50 days	0%

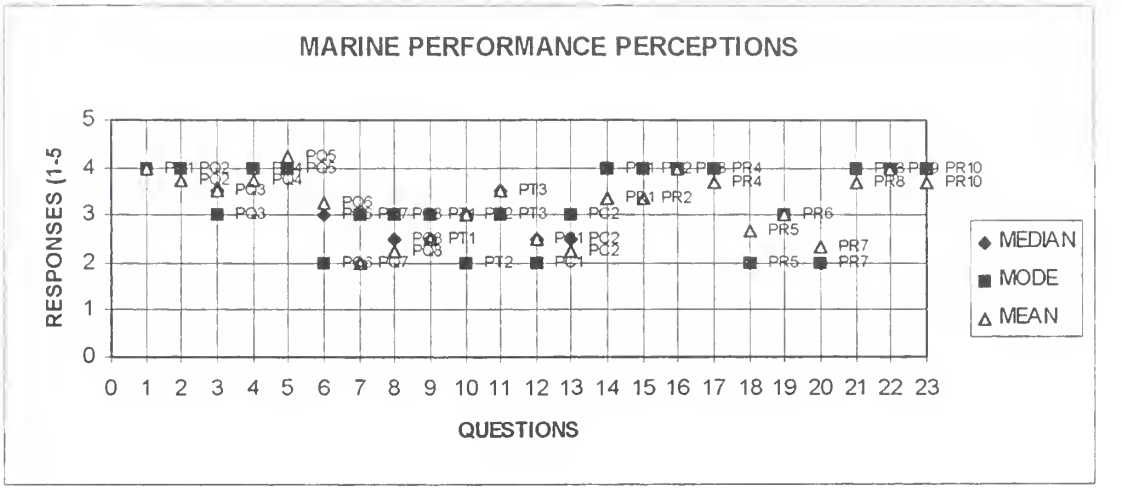
Aircraft MCAPP cost should be less than:

$(000)	% of Marines with response
$700K	20%
$500K	60%
$300K	20%
$100K	0%

The following chart and graph show the performance perception responses received from Marine customers:

MARINE PERFORMANCE PERCEPTIONS

QUESTION	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PT1	PT2	PT3	PC1	PC2	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10
MEDIAN	4	4	3.5	4	4	3	2	2.5	2.5	3	3.5	2.5	2.5	4	4	4	4	2	3	2	4	4	4
MODE	4	4	3	4	4	2	3	3	3	2	3	2	3	4	4	4	4	2	3	2	4	4	4
MEAN	4	3.8	3.5	3.8	4.3	3.3	2	2.3	2.5	3	3.5	2.5	2.3	3.3	3.3	4	3.7	2.7	3	2.3	3.7	4	3.67
VARIANCE	0.7	1.6	1.7	0.3	0.3	2.3	1.3	0.9	0.3	1.3	1.7	0.3	0.9	1.3	1.3	0	0.3	1.3	1	2.3	2.3	1	0.33
STD DEV	0.8	1.3	1.3	0.5	0.5	1.5	1.2	1	0.6	1.2	1.3	0.6	1	1.2	1.2	0	0.6	1.2	1	1.5	1.5	1	0.58



The results of the "other" section of the performance perception part of the questionnaire were as follows:

The overall quality of NADEP NI's F/A-18 maintenance program is:

Response	**% of Marines with response**
Very Poor	0%
Poor	0%
Fair	0%
Good	75%
Excellent	25%

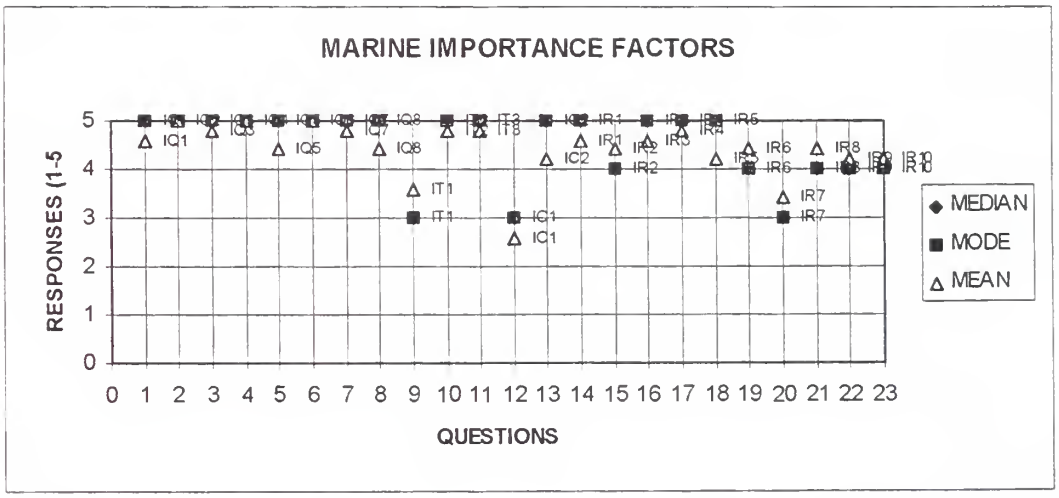
My feelings towards NADEP NI's services can be best described as:

Response	**% of Marines with response**
Very Unsatisfied	0%
Unsatisfied	0%
Neutral	25%
Satisfied	75%
Very Satisfied	0%

The following chart and graph show the importance factor responses received from Marine customers:

MARINE IMPORTANCE FACTORS

QUESTION	IQ1	IQ2	IQ3	IQ4	IQ5	IQ6	IQ7	IQ8	IT1	IT2	IT3	IC1	IC2	IR1	IR2	IR3	IR4	IR5	IR6	IR7	IR8	IR9	IR10
MEDIAN	5	5	5	5	5	5	5	5	3	5	5	3	5	5	4	5	5	5	4	3	4	4	4
MODE	5	5	5	5	5	5	5	5	3	5	5	3	5	5	4	5	5	5	4	3	4	4	4
MEAN	4.6	5	4.8	5	4.4	5	4.8	4.4	3.6	4.8	4.8	2.6	4.2	4.6	4.4	4.6	4.8	4.2	4.4	3.4	4.4	4.2	4.2
VARIANCE	0.3	0	0.2	0	1.8	0	0.2	0.8	1.8	0.2	0.2	0.3	1.2	0.3	0.3	0.3	0.2	1.2	0.3	0.8	0.3	0.7	0.7
STD DEV	0.5	0	0.4	0	1.3	0	0.4	0.9	1.3	0.4	0.4	0.5	1.1	0.5	0.5	0.5	0.4	1.1	0.5	0.9	0.5	0.8	0.8



The results of the "other" section of the importance factors part of the questionnaire were as follows:

Please rank in order of importance the following considerations as they relate to depot maintenance of F/A-18 aircraft: (Cost, Quality, Turnaround Time)

100% of Marine responses ranked quality first, turnaround time second and cost third.

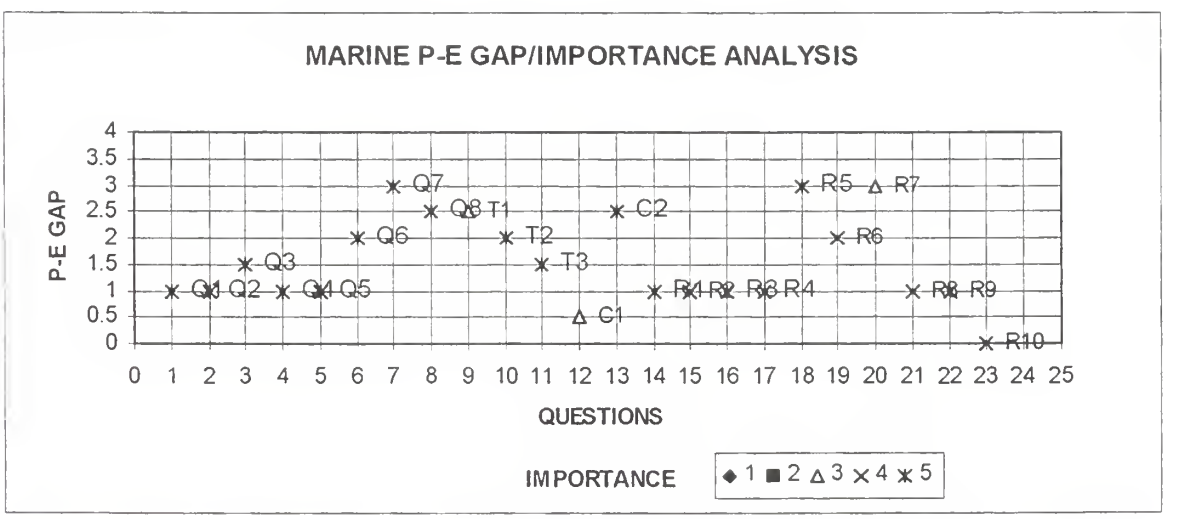
My need to understand the depot's capabilities and constraints is:

Response	% of Marines with response
Very Unimportant	0%
Unimportant	0%
Undecided	0%
Important	60%
Very Important	40%

The following chart and graph represent the results of conducting a P-E gaps/Importance factor analysis from Marine responses:

MARINE P-E GAPS/IMPORTANCE ANALYSIS

QUESTION	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
EXPECTATIONS	5	5	5	5	5	5	5	5	5	5	5	3	5	5	5	5	5	5	5	5	5	5	4
PERFORMANCE	4	4	3.5	4	4	3	2	2.5	2.5	3	3.5	2.5	2.5	4	4	4	4	2	3	2	4	4	4
IMPORTANCE	5	5	5	5	5	5	5	5	3	5	5	3	5	5	4	5	5	5	4	3	4	4	4
P-E GAP	1	1	1.5	1	1	2	3	2.5	2.5	2	1.5	0.5	2.5	1	1	1	1	3	2	3	1	1	0



The results of this analysis show that in order to improve customer satisfaction among Marines, NADEP NI should immediately focus its efforts on improving the

consistency of PACE inspections and informing customers about specific work performed on their aircraft as part of MCAPP. Other attributes of concern were modifications requested by the squadron being accomplished during MCAPP, MCAPP cost accurately reflecting actual depot man-hours expended, aircraft being delivered FOD-free and aircraft completing depot maintenance on schedule. Marine customers had eleven attributes with a P-E gap greater than one, with eight of them having an importance factor of five.

Marine customers seem to be satisfied with the services they receive from NADEP NI. Overall, the Navy seemed to have a much higher level of customer satisfaction than the Marines. However, upon analyzing the data, this seems to be a function of Marines having higher expectations rather than lower performance perceptions of NADEP NI.

H. CONCLUSION

The following table shows the P-E gaps/importance analysis of all customer groups. The P-E gaps that are underlined have an importance factor of five. The P-E gaps that are italicized have an importanct factor of four. P-E gaps in regular type have and importance factor of three. (There were no importance factors below three)

CUSTOMER GROUP P-E GAPS/IMPORTANCE ANALYSIS SUMMARIZATION

CUSTOMER	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	T1	T2	T3	C1	C2	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10
SQUADRONS	1	1	1	1	1	1	2	2	1	1	2	0	1	1	1	1	2	1.5	1	2	0	1	0.5
WINGS	1	2	2	1	1	2	4	2	3	3	2	1	3	1	2	1	1	3	1	3	1	1	0
TYCOMS	0	2	1	1.5	1	1	2.5	0	0.5	1.5	1	1	0.5	1	0	0	0.5	0.5	1	0	1	0.5	0
NAVAIR	0	1	1	1	0	0	1	0	1	1	0	0	0	0	1	0	-2	-1	0	-1	0	0	0
EAST COAST	1	2	1	1	1	2	2	1.5	2	3	1	0.5	2	1	2	1	1	1.5	1	1 5	0.5	1	1
WEST COAST	0.5	1	1	1	1	1	1	2	2	0.5	1	0	1	1	1	0.5	0.5	0.5	1	2	0	1	0
NAVY	1	1	1	1	1	1	1	2	1	2.5	2	0 5	1	1	1	1	2	1.5	1	1.5	0	1	0
MARINE	1	1	1.5	1	1	2	3	2.5	2.5	2	1.5	0.5	2.5	1	1	1	1	3	2	3	1	1	0

The following summarizes, by customer groups, the most important attributes on which NADEP NI must focus to improve customer satisfaction:

Squadrons:

* Consistency of PACE inspections
* Notifying customers about any schedule changes

Wings:

* Consistency of PACE inspections
* Depot maintenance not impacting operational requirements
* Completing depot maintenance of aircraft on schedule

TYCOM:

* Consistency of PACE inspections
* Completing depot maintenance of aircraft on schedule

NAVAIR:

* Consistency of PACE inspections

East Coast:

* Consistency of PACE inspections
* Completing depot maintenance of aircraft on schedule

* Ensuring aircraft are free of quality defects
* Ensuring aircraft are FOD free

West Coast:

* Depot maintenance not impacting operational requirements
* Completing all requested modification or special rework during MCAPP

Navy:

* Completing depot maintenance of aircraft on schedule
* Notifying customers about any schedule changes

Marines:

* Consistency of PACE inspections
* Informing customers about specific work performed on their aircraft

The P-E gaps/importance analysis was an excellent analytical tool to develop a tailored set of customer satisfaction metrics for NADEP NI. It provided the means to analyze data from different customer points of view, which helped focus our efforts. This method would be very beneficial for other service depots and government agencies who wish to measure customer satisfaction. **The key element, as noted previously, is the necessity to educate the customer about the NADEP's various capabilities and constraints in order for the customer to develop realistic expectations.**

VI. A PROPOSED CUSTOMER SATISFACTION MEASUREMENT SYSTEM FOR NADEP NORTH ISLAND

This chapter will propose a set of customer satisfaction (CS) measures for NADEP North Island's F/A-18 Program, based on the information presented in the previous chapters. It will also discuss implementation of the proposed CS measures and how NADEP NI can best use the CS information they provide. The proposed set of customer satisfaction measures includes the following:

- a single point of contact within the F/A-18 PMTO for customer liaison
- a customer concern tracking system
- a squadron level customer satisfaction survey
- a CS interview survey for use with all customer levels
- a customer satisfaction index (CSI)

A. SINGLE POINT OF CONTACT

A single point of contact (SPOC) for PMTO customer liaison would have two important benefits for the PMTO organization. First, it would make it easier for customers to communicate with the PMTO, get rapid responses to questions and voice concerns. Second, it would serve as a focal point for all PMTO customer satisfaction data and information. This would facilitate the second element of the proposed set of CS measures: a customer concern tracking system.

As noted in Chapter V, questionnaire feedback from squadrons indicate they are very satisfied with the current points of contact they have with NADEP NI. This would appear to contradict the need for a SPOC, at least from a squadron perspective. In reality, most squadrons do not often contact NADEP NI directly for MCAPP scheduling and related information; they usually go through their wing maintenance officers or depot coordinators. For ISR work or scheduling PACE inspections, they contact the local

NADEP field team representative. Complaints may be recorded on ADRs or on the depot's customer survey, when aircraft are returned to the squadron. Many squadron concerns, though, are probably not voiced beyond the local level. Therefore, these are lost improvement opportunities for the PMTO.

As stated in Chapter III, a key finding of the National Performance Review's report on resolving customer complaints was the importance of making it easy for customers to complain. (Gore 96) The PMTO actively encourages customers to contact the PMTO. Telephone and fax numbers are widely distributed to customers at meetings and on survey forms. However, customers are not assured of getting the right person within the PMTO to quickly handle their questions or concerns. Most decisions to commit resources must be approved by the head of the PMTO, the F/A-18 Product Manager. This individual has broad responsibilities and is understandably not always immediately available. A SPOC should be given the authority to approve uncomplicated requests on the spot when contacted by customers, and commit resources within a specified scope to resolve problems: this would significantly improve the PMTO's customer interface.

A PMTO CS SPOC could also notify customers of schedule changes and update the LAST bulletin board system on a real time basis. Currently, the LAST system is updated once every two weeks. Some customers we spoke with indicated this limited the utility of the system.

This CS SPOC function could be tasked to an existing position within the PMTO or a new position could be created by reassigning duties within the PMTO. Alternately, various PMTO personnel could perform the CS SPOC function on a rotating basis. All of these options maintain overall manning at current levels. The person(s) filling the CS SPOC billet would need excellent familiarity with NADEP's mission, processes and customers, training in CS measurement and analytical techniques, familiarity with simple computer database programming, and strong interpersonal skills.

A working example of a SPOC for all customer issues is NADEP Cherry Point's Customer Liaison Office (CLO). This CLO is the depot's main point of contact for all customer matters, including routine information and status requests. Cherry Point's CLO is staffed with three full-time personnel, and is the SPOC for the entire NADEP, not just one aircraft program. Because of the size of the F/A-18 program and the PMTO, a SPOC dedicated to the F/A-18 program would likely provide better service to the customer.

B. A CUSTOMER CONCERN TRACKING SYSTEM

A key function of the PMTO's CS single point of contact would be maintaining a customer concern tracking system. NADEP's F/A-18 PMTO currently collects a lot of customer satisfaction data by various means. Much of the potential value of this information goes unrealized. Not all CS data is systematically collected and analyzed, and the resulting CS information made available to all personnel within the PMTO. Specifically, the telephone was identified by PMTO personnel as the major channel for receiving and resolving customer concerns. Customer concerns addressed via telephone to PMTO personnel, and the associated actions taken, are not recorded in any systematic way. An improved system would channel all customer satisfaction data, whether received by telephone, ADR, survey, interview, etc., to the PMTO's CS SPOC. The SPOC would be responsible for collecting and recording CS data, analyzing it and then disseminating CS information within the PMTO. This would allow a better picture of the scope and variety of customer concerns to be shared by all members of the PMTO staff.

A relational database is the simplest way to record all customer concerns, subsequently analyze the data, and produce reports. Any of several popular commercial off-the-shelf database programs would work for this relatively small database. Recommended data fields to record for each customer concern include:

customer concern file number (including date and criticality code)

customer (activity) name

customer POC

customer address

customer telephone number

customer fax number

customer type (code for squadron, wing, TYCOM, NAVAIR)

BUNO (if concern is applicable to a specific aircraft)

type of depot work (MCAPP, ISR, drive-in mod, etc.)

type of concern (special request, scheduled delivery, FOD, etc.)

details of concern

date received

how received (ADR, survey, telephone, interview, etc.)

date action assigned

action assignee

date of initial response to customer

date of latest interim response to customer

date of final response to customer

concern status (open or closed)

C. SQUADRON LEVEL CUSTOMER SATISFACTION SURVEY

The current NADEP NI Quality Process Improvement Questionnaire (see Chapter II, Figure 2-6) is a well-designed and useful tool to measure Squadron level customer satisfaction. Based on the CS theory material presented in Chapter III, some parts of the questionnaire can be improved; the response data can also be better used by the depot. Also, based on the gaps analysis information presented in Chapter V of our pretest questionnaire, NADEP's questionnaire could be changed to focus more on those issues with which current customers are dissatisfied.

This survey is primarily a transaction measure. Its purpose is to gather actionable data concerning a particular transaction between the squadron and the depot. The survey also contains some questions to measure relationships. The depot needs to understand that answers or grades given by the squadron to relationship questions will be greatly affected by their experience with that particular transaction. A better relationship measure of squadron perceptions would be performed separately, using the interview survey discussed in the next section of this chapter.

Because of the relatively low number of transactions, and their high cost, the depot should get survey input for every possible transaction. The PMTO CS SPOC may wish to follow-up with squadrons from whom surveys are not received. Besides tracking down valuable CS data, the phone call is another opportunity to demonstrate the depot's commitment to CS. The survey should be given to the squadron after completing MCAPP or other depot level maintenance, and after completing in-service repair (ISR) work or drive-in modification (DIM) work at field locations. The survey should always be provided with a point of contact name and phone number, in case of questions, and with a self-addressed stamped envelope. For consistency and quality of response, the survey should be filled out by the squadron's Maintenance/Material Control Officer (MMCO). By position, this one individual has the best overall knowledge of the work performed by the depot, the depot coordination function within the squadron and the impacts of schedule issues on operational commitments.

As mentioned in the SPOC section above, if the survey response contains any significant customer concerns, the concerns should be entered into the PMTO's CS database and the SPOC should follow-up with a phone call to the squadron.

Two squadron related areas stood out in our pretest questionnaire as areas where NADEP NI could improve customer satisfaction. These were consistency of PACE inspections and notification by NADEP of schedule changes. Other areas with smaller performance-expectation gaps or importance ratings include the following:

- response time to questions or requests for engineering dispositions
- understanding the specific work that was performed on the aircraft
- proper documentation in aircraft logbooks
- squadron work requests over and above the MCAPP specification
- FOD
- impact of depot maintenance and scheduling on the squadron's ability to operate

It is interesting to note that basic quality issues were not seen as dissatisfiers by the squadrons on our pretest questionnaire. There is an explanation for this, beyond the fact that the quality of NADEP NI's work is indeed very high. In naval aviation maintenance, quality is really "a given." Therefore, most squadrons are most dissatisfied with the "supplemental" aspects of depot maintenance. (Sloan 1994) NADEP NI's squadron level survey must retain questions dealing with basic quality issues to ensure squadron satisfaction is maintained.

Based on the above, Figure 6-1 is a proposed revision of NADEP NI's Quality Process Improvement Questionnaire.

D. A CS INTERVIEW SURVEY FOR USE WITH ALL CUSTOMER LEVELS

In order to measure relationship issues at the squadron level, and to measure general customer satisfaction at the other customer levels (wing, TYCOM, NAVAIR), another type of survey is needed. Figure 6-2 is a proposed CS interview survey for use with all customer levels. An interview survey was chosen based on the theoretical CS information presented in Chapter III and the experience of NADEP Cherry Point's Customer Liaison Office. There are three key advantages to using an interview survey. First, the response rate is obviously very high. Second, the interviewer can be sure they are talking to the correct person within the customer activity. If necessary, answers can be obtained from two or more persons during the interview. Finally, the interview format often gathers important data which wouldn't be reflected in simple answers

Quality Process Improvement Questionnaire

FOR SQUADRON MMCO: This questionnaire provides NAVAL AVIATION DEPOT NORTH ISLAND with invaluable information from the F/A-18 community. The feedback you provide will be used for our continuous process improvement efforts. If you have any questions concerning the work performed on your aircraft, or if there are any services we can provide, please contact the F/A-18 Program Management Team Office (PMTO) Customer Liaison at DSN 735-4821 or COMMERCIAL (619) 545-4821, FAX # 735-3569.

BUNO_____ NADEP NI SEQ NO. (IF KNOWN)_____

DATE AIRCRAFT RETURNED TO SQUADRON_____

TYPE OF DEPOT WORK (MCAPP, ISR, DRIVE-IN MOD)_____

LOCATION WHERE WORK PERFORMED_____

LEGEND

POOR	**0**
MARGINAL	**1**
FAIR	**2**
VERY GOOD	**3**
EXCELLENT	**4**

PLEASE ASSIGN A GRADE TO NADEP NORTH ISLAND'S PERFORMANCE IN EACH OF THE FOLLOWING AREAS:

0	1	2	3	4

A. AIRCRAFT CONDITION
- Overall Workmanship ----------
- Paint (IAW NA 01-1A-509, Appearance) ----------
- Flight Controls (rigging, security) ----------
- Power Plants (rigging, security) ----------
- Interior (FOD free, security) ----------
- Electrical and Avionics (condition, security) ----------
- Overall Cleanliness ----------
- Logbooks (completeness and accuracy of depot entries) ----------

B. SERVICE (AS APPLICABLE)
- Pre-Depot Inspection Process (PACE/ PDM, consistency) ----------
- Depot Availability (wait for services) ----------
- Communications fm Depot to Squadron (schedule changes) ----------
- Ease of Communicating with Depot ----------
- Schedule Performance (on time delivery) ----------
- Rapid Response (engineering dispositions, requests) ----------
- Depot Efforts to Minimize Operational Impact ----------
- Depot Efforts to Accommodate Special Requests ----------
- Depot Efforts to Ensure My Understanding of Work Performed -----

C. GENERAL COMMENTS/RECOMMENDATIONS: _____

_____

_____

_____

Squadron MMCO:_____ Activity: _____ Phone: _____

Please return completed form in provided stamped pre-addressed envelope to:

Commanding Officer Naval Aviation Depot, Code 54200, PO Box 357058, San Diego, CA 92135-7058

Figure 6-1. Proposed F/A-18 PMTO Quality Process Improvement Questionnaire

NADEP North Island F/A-18 PMTO
Customer Satisfaction Interview Survey

Customer (activity) name_____ Interviewer_____ Date of interview_____

Customer POC_____ Telephone number_____ Fax number_____

Customer mailing address_____

Customer type: ____squadron ____wing ____TYCOM ____NAVAIR ____other

1. What NADEP North Island F/A-18 products or services do you use? How would you rate these products and services in terms of schedule performance and quality?

Product or Service	**Sched. Performance**		**Quality Grade**				
(Example: MCAPP, ISR)	Acceptable	Unaccept.	Poor	Marginal	Fair	Very Good	Excellent

Additional Comments: _____

2. Are NADEP NI's products and services ideally structured to meet your needs? How could they be better? _____

3. Is NADEP NI's F/A-18 PMTO responsive to your needs and concerns? How could we improve? _____

4. Do you feel NADEP NI's F/A-18 PMTO gives you value for your money? How could we improve? _____

5. Would you consider going elsewhere for the services you are currently receiving from NADEP NI? If so, why? _____

Note to Interviewer: customer feedback required? ____Yes ____No

Figure 6-2. Proposed F/A-18 PMTO Customer Satisfaction Interview Survey

provided on a survey form. The main drawback of this type of survey is that customers may be reluctant to criticize an activity in a face-to-face or telephone situation. A skilled interviewer can convince the customer that they value truly candid answers.

Most of the questions on this survey are similar to the depot CS survey conducted twice annually by NAVAIR Code 6.0. This survey should be administered in-person, or possibly over the phone. It is relatively quick to complete. The questions are broad in nature so they can be used for a variety of customers; however, they are designed to elicit specific areas of dissatisfaction from whoever is being interviewed.

This survey would be administered by the PMTO'S CS SPOC during visits to customer sites, at meetings like the quarterly F/A-18 Modification Management Meeting, which provide opportunities to talk with a variety of customers, or over the phone. Customer concern data would be entered into the customer concern database.

E. A CUSTOMER SATISFACTION INDEX

The fifth and final element of the proposed set of CS measures for NADEP NI's F/A-18 PMTO is a Customer Satisfaction Index (CSI). This is a monthly average of all quantifiable data points from Quality Process Improvement Questionnaires and Customer Satisfaction Interview Surveys received during the month. The scales on both surveys are identical (Poor - 0, Marginal - 1, Fair - 2, Very Good - 3. Excellent - 4). The monthly average is plotted on a 4.0 scale.

Though it is similar in appearance, this CSI differs significantly from the GPA measure currently used by the PMTO. The CSI includes CS survey data from several different types of customers, and data points from both transaction and relationship measures. Because it incorporates a variety of measures and all levels of the PMTO's customers, it is a better overall measure. However, PMTO managers must understand the limitations of this, or any CSI. It is only useful for measuring an overall trend.

Understanding which program areas satisfy customers, and which areas need improvement, requires a detailed analysis of the survey data.

Figure 6-3 shows a sample CSI chart.

F. IMPLEMENTATION ISSUES

Several things need to be considered to successfully implement the CS measurement system described above. The first and most important of these is the decision to implement the system fully or partially. The five elements proposed above comprise an integrated way to collect and analyze CS data, and make CS information available about all four of the PMTO's customer levels. Some of the elements would not be effective if implemented on their own, or without certain other elements. For example, a customer concern database would not be a useful resource without the SPOC function to update and analyze it. Similarly, continuing to do CS surveys of squadron customers while ignoring other PMTO customer levels gives a distorted view of how well the PMTO is accomplishing its mission. Implementing less than the complete set of CS measures would limit what the PMTO could learn about its complex set of customer requirements.

The two key issues in successfully implementing the system are gaining the PMTO organization's support and setting up the CS SPOC position within the PMTO. Gaining PMTO's support is not a trivial matter. It involves a major change in how customer concerns are viewed. Currently, the PMTO is justifiably proud of the low number of "complaints" it receives (validated ADR discrepancies and negative scores/comments from squadron surveys). Management based on customer satisfaction views customer feedback as absolutely vital to gauging the organization's success and setting its direction. This requires actively seeking out customer concerns and acting on them. To collect as much CS data as possible, all PMTO personnel need to appreciate the value of customer concerns in improving the quality of services they provide. The

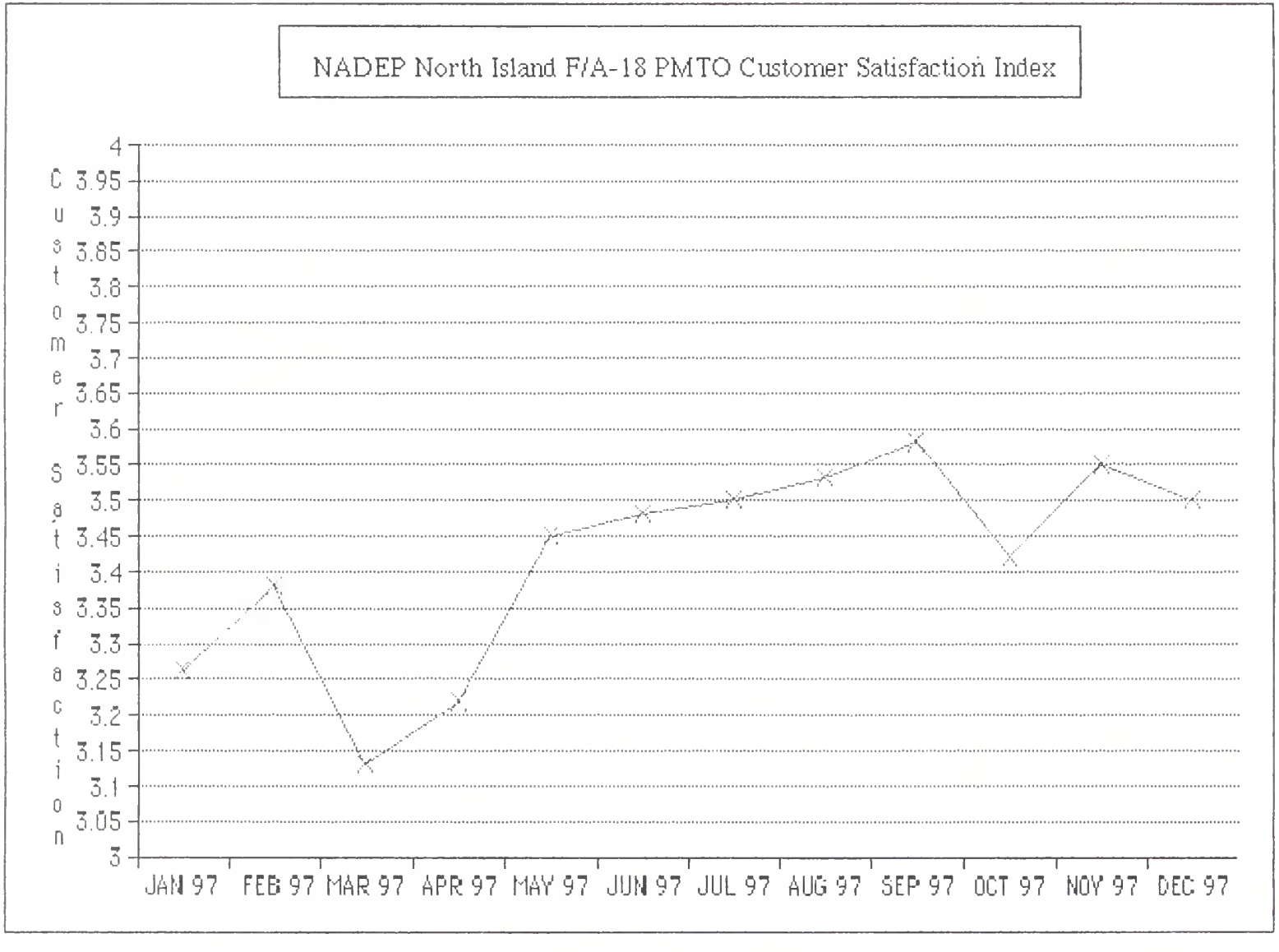


Figure 6-3. Proposed F/A-18 PMTO Customer Satisfaction Index Chart

authors believe the information presented in this thesis and the references present a convincing case for adopting these CS measures; similar material might help generate support within the PMTO.

Notwithstanding the above, NADEP NI personnel are likely to be supportive of an improved CS measurement system. The depot's experience of losing work to the Air Force and their subsequent dramatic performance improvement is still fresh in the minds of most NADEP NI personnel. This episode occured because of dissatisfied customers. The depot has done a lot of TQM training in the past several years, so most NADEP NI personnel understand the concept of gauging performance from a customer point of view There has also been a lot of recent press given to CS and CS measurement, from a variety of sources. Therefore, there is no better time to implement this system than the present.

Establishing the CS SPOC position within the PMTO is a significant organizational change. As stated above, the position requires a certain amount of decision authority when responding to customer concerns. The nature of the position and the tasks involved would change at least some daily routines and possibly the responsibilities of several other PMTO positions. This position needs to be implemented with sensitivity to the needs and desires of the people within the PMTO. Some options for staffing this position have already been provided. The SPOC billet might also be filled by one of the military officers assigned to the PMTO. This would lessen the impact on civilian positions. A military officer may be best suited to interfacing with the PMTO's customers, who are mostly military officers as well.

There are some other incidental implementation issues. To best use the CS interview survey, the PMTO should have a plan for completing a minimum number of these from each customer level within a given time period. For example, the PMTO may decide that they need responses from three Navy and one Marine Corps squadron, one east and one west coast wing, two from TYCOMs and one from NAVAIR. Based on

travel and meeting schedules for the quarter, the PMTO can integrate these surveys into their workload.

To maintain customer support in filling out surveys and providing honest and thoughtful feedback, customers must feel that the information they provide is being put to good use. PMTO process improvements resulting from CS measurement need to be communicated to customers. Hopefully, most of these improvements will be obvious to customers. They should also be advertised by the PMTO at meetings, during customer interviews, in NADEP's promotional material, through in-house newsletters, on electronic bulletin boards (such as LAST) and on the NADEP's web site.

In time, as process improvements are made or changes occur in the products the PMTO provides, the set of CS measures will need to be reevaluated. Customer expectations and importance ratings of different attributes will change. New CS attributes may arise. To adapt the PMTO's CS measures, it is necessary to perform another gaps analysis survey, along the lines of the survey shown in Chapter Four. The PMTO's CS SPOC should be able to coordinate this effort, following the methodology used in this thesis. This should be done when the environment and the PMTO's processes change significantly. In the PMTO's current environment, with major changes being discussed for F/A-18 depot maintenance, another gaps analysis survey should certainly be done in the next two to three years.

G. INTEGRATING CS INFORMATION INTO DECISION MAKING AND REWARD SYSTEMS

An important aspect of emphasizing customer satisfaction is integrating CS information into the organization's decision making and reward systems. If CS information is not used when making relevant decisions, or worse, ignored, the organization is wasting resources in collecting and analyzing CS data. To ensure CS information is used, it should be made widely available throughout the organization.

Because people will work towards those goals on which their incentive systems are focused, CS improvement must be rewarded. However, it is not a simple task to reward government employees based on customer satisfaction. For example, rewards can't be tied to the number of complaints received. If rewarded for a low number of complaints, the organization's personnel may discourage important CS feedback. Being rewarded for a high number of customer complaints is similarly counterproductive and might encourage recording extraneous data. A better measure of CS performance might be tracking the number of customer concerns resolved or quantifying improvements in terms of customer time or money saved. Linking individual or small group rewards directly to a customer satisfaction index is also not recommended. Controlling the index would likely become the goal, instead of satisfying customers. Rewards for a larger group (e.g. - the entire organization) based on improvement of a CS index may be workable, but they dilute the incentive effect. In any case, any objective performance measure considered must be thoroughly analyzed to understand what probable incentive effects it will have on personnel, and to see if the performance measure can be "gamed."

An effective way for the PMTO to incentivize individual and small group CS improvement efforts is by incorporating CS responsibilities and goals within applicable employee position descriptions, performance plans and appraisals. Management must then honestly assess the individual's contribution toward providing better customer service, as measured by the customers. The depot should ask key customers for input on the performance of NADEP customer contact employees (SPOC, field team supervisors). Though subjective, this method can support rewards through promotions, step increases, performance bonuses, and other employee recognition.

H. EDUCATING THE CUSTOMER

A final consideration in measuring customer satisfaction is educating the customer. This thesis draws on the widely accepted concept that customer satisfaction is related to

related to the gap, or difference, between customer expectations and the customer's perceptions of performance. That gap can be closed, and customer satisfaction increased, in two ways: improving service and changing customer expectations. Expectations are changed by educating customers about the organization's capabilities and constraints. Educated customers provide another important benefit. The feedback from an educated customer is much more useful for process improvement than that provided by a customer who doesn't understand the organization's business.

Customers won't normally seek out detailed information on a service provider's business. Therefore, the burden of educating the customer falls upon the service provider. Customers can learn about an organization's capabilities and constraints in the same ways used to publicize improvements resulting from CS measures. These include PMTO advertisements at meetings, during customer interviews, in NADEP's promotional material, on electronic bulletin boards (such as LAST) and on NADEP's web site.

VII. CONCLUSIONS , RECOMMENDATIONS, AND AREAS FOR FURTHER RESEARCH

A. CONCLUSIONS

This thesis discussed the importance of CS measurement in a DoD depot program and presented a methodology to build a tailored set of customer satisfaction measures for that depot program. This methodology has wide applicability to other NADEP North Island programs, DoD depots and government organizations in general. From this research, the following can be concluded:

1. Customer Satisfaction Measurement is a Critical Management Activity for DoD Depots

Correctly measuring CS can lead to more efficient and effective depot operations. This can occur through reduced costs by identifying non-value adding tasks, by setting appropriate service levels and priorities, and also by increasing a depot's customer base. Depots must make it easy for their customers to complain. They must record and track key CS indicators relevant to their products and processes. They must act on the information generated by their CS measures and demonstrate their responsiveness to customer desires.

2. CS must be Measured by a Variety of Measures

No single measure or measurement technique can provide all the CS information that a depot needs. A well designed CS measurement system will include direct and indirect measures, relationship and transaction measures, and measures of supplemental factors. Measuring CS is a complex task for a depot because the depot has several levels of customers. Different customers care about different things, and measure their own satisfaction differently. CS measures should include all the depot's products and services,

especially those with a high bearing on CS, such as field teams. All CS measures chosen must provide actionable data and merit their administrative cost to the depot and the customer.

3. A "Gaps Model" is an Appropriate Tool for Measuring CS at DoD Depots

The technique of comparing customer expectations with customer perceptions of performance, combined with customer rankings of attribute importance, is well established in CS literature as well as practical application. The model's ability to identify significant CS attributes, and to facilitate analysis by different customer groups makes it particularly suitable to a depot's complex CSM requirements.

4. Customers Need to be Educated

Customer satisfaction can be increased in two ways: improving service and changing customer expectations. Establishing reasonable customer expectations potentially offers gains for the least cost. Expectations are changed by educating customers about the depot's capabilities and constraints. The depot must take the initiative to do this, as customers won't do it on their own. Educated customers provide the additional benefit of giving the depot better process improvement feedback.

B. RECOMMENDATIONS

Specific CS focus areas and action recommendations based on responses to our pretest questionnaire are provided at the end of Chapter Five for the NADEP NI F/A-18 PMTO's use. Additional source data has also been provided to the PMTO. The following are our general recommendations to improve the PMTO's CSM system:

1. Implement the Full Set of CS Measures Proposed in Chapter VI of this Thesis.

The current CS measures focus solely on the squadron level customer, and only measure certain attributes. The PMTO does not record most of the customer satisfaction data it receives, and therefore opportunities to improve processes may be missed. The proposed measures tracks and records CS data from all customer levels, and are based on an analysis of current customer satisfaction and attribute importance levels for each customer level. A PMTO single point of contact for customer concerns will make it easier for customers to communicate with the PMTO. CS information should be integrated into decision making and employee reward systems, and shared throughout the depot for process improvement. Non-value adding CSM activities should be identified and discontinued.

2. Continue to Establish Closer Ties with Customers

Though the depot has several customer levels, the number of customers at most levels is very small. It is therefore possible for the depot to maintain very close ties to its customers. The closer these tie, the more likely that the depot will understand its customers' concerns. The depot should make a strong effort to develop goodwill and easy communications with customers, and be responsive to concerns presented. This will encourage customers to provide the depot the quality CS feedback it needs to improve and survive. Towards this end, NADEP NI should continue initiatives such as lobbying to attend Operational Advisory Group (OAG) meetings and other forums where customer concerns are discussed. The depot must also be willing to share information with its customers on capabilities, schedules and performance to the limits of available electronic tools.

3. Educate Customers, Particularly Squadrons

The nature of the work that NADEP NI performs is largely invisible to the squadron customer; the most visible aspect is the aircraft's paint job. Squadrons are the depot's ultimate customer, and have a large voice in how naval aviation resources are used. The depot should take the initiative to ensure these customers understand the content of depot maintenance programs and what value they add for the squadron customer. To keep these customers engaged, the depot must be responsive and publicize improvements resulting from CS concerns.

4. Share Information on the Depot Customer Liaison Function with other Depots

OPNAV Instruction 4790.2F requires NADEPs to maintain a Customer Liaison Program. It was obvious during our research that different NADEPs do this differently. As experience and understanding grow in this area, some techniques will prove more effective than others. DoD depots, while sometimes potential competitors, should maintain dialogues with one another to remain on the cutting edge of public sector CS initiatives.

C. AREAS FOR FURTHER RESEARCH

In the course of this research, many ideas surfaced which could provide fruitful areas for further research. One idea specifically tied to this thesis is an investigation of the actual costs and benefits of implementing this CS measurement system at NADEP North Island. Some other ideas are:

- Redesigning and combining the Aircraft Discrepancy Report with other customer feedback mechanisms to create a simpler and more useful form for quality assurance and CSM purposes.

- Using NALDA data to measure the improvement in aircraft performance/reliability as a result of depot maintenance.

- Designing and evaluating a system in which the cost to customers of depot maintenance reflects the actual work performed on their aircraft.

- Developing better customer satisfaction incentive structures and reward systems for depots and other government activities.

- Comparing the long-term performance of activities rewarding CS improvement with activities using traditional reward systems.

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